



Apparatus Specialists, Inc.

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League City TX Pumper Post-Preconstruction Specifications

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.

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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 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

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the Fire Department personnel in the proper operation, care and maintenance of the equipment delivered.

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.

1. 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.
2. 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).
3. 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.
4. 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.
5. 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).
6. 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

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to the vehicle.

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 manufacturer, under full loads and all other loading conditions.

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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 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.

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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 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

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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.

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:

1. Owner name and address
2. Apparatus manufacturer, model, and serial number
3. Chassis make, model, and serial number
4. GAWR of front and rear axles
5. Front tire size and total rated capacity in pounds

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6. Rear tire size and total rated capacity in pounds
7. Chassis weight distribution in pounds with water (if applicable) and manufacturer mounted equipment (front and rear)
8. Engine make, model, serial number, rated horsepower, related speed and no load governed speed
9. Type of fuel and fuel tank capacity
10. Electrical system voltage and alternator output in amps
11. Battery make and model, capacity in CCA
12. Paint numbers
13. 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)
14. Written load analysis and results of the electrical system performance tests
15. Transmission make, model, and type
16. Pump to drive through the transmission (yes or no)
17. Engine to pump gear ratio and transmission gear ratio used
18. Pump make and model, rated capacity in gallons per minute, serial number, and number of stages
19. Pump manufacturer's certification of suction capability
20. Pump manufacturer's certification of hydrostatic test
21. Pump manufacturer's certification of inspection and test for the fire pump
22. Copy of the apparatus manufacturer's approval for stationary pumping applications
23. Pump transmission make, model and serial number
24. Priming device type
25. Type of pump pressure control system
26. The engine manufacturer's certified brake horsepower curve for the engine furnished, showing the maximum no load governed speed
27. Certification of the water tank capacity

ELECTRICAL SCHEMATICS

The apparatus manufacturer shall supply one (1) set(s) as-built wiring schematics, to include all line voltage schematics, with each apparatus.

WARNING AND INFORMATION LABELS

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

FIRE APPARATUS SAFETY GUIDE

A Fire Apparatus Safety Guide published by Fire Apparatus manufacturer's Association shall be provided with the apparatus upon delivery. This manual includes essential safety information for fire fighters, fire chiefs, apparatus mechanics, and fire department safety officers. The guide is applicable to municipal, wildland, and airport firefighting apparatus manufactured on either custom or commercial chassis.

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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:

- Chassis when available at manufacturing facility
- Body – Prior to Paint
- Body – Painted
- Pump and Plumbing
- 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.

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

A structural Aluminum 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 ten (10) 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.

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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.

APPARATUS TEST BY UNDERWRITERS LABORATORIES

The following Apparatus shall comply with all NFPA 1901 applicable regulations in effect as of the contract signing date. There shall be multiple tests performed by the contractor and Underwriter's Laboratories when the apparatus has been completed. The manufacturer shall furnish the completed Test Certificate(s) to the purchaser at time of delivery. Since the inspection services of Underwriters Laboratories are available to all bidders on an equal basis, no other third party testing service shall be acceptable. The tests conducted on the apparatus shall include, but not be limited to:

PUMP & PLUMBING PERFORMANCE TEST

The apparatus pump and plumbing system shall be tested and certified.

12 VOLT ELECTRICAL TEST

The apparatus low voltage electrical system shall be tested and certified.

FIRE STATION PRE-CONSTRUCTION CONFERENCE

The factory authorized Distributor shall be required, prior to manufacturing, to have a pre-construction conference at the fire departments station with individuals from the League City Fire Department to finalize all construction details.

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 three (3) individuals from the League City Fire Department to inspect the apparatus during construction.

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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 three (3) individuals from the League City Fire Department to inspect the 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 4 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 4 hour structured training course to be repeated three times to cover each of the 3 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 with no restrictions to the maximum overall length.

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,

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Front Bumpers, Etc.

MAXIMUM WHEEL BASE REQUIREMENT

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

MODEL

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

MODEL YEAR

The chassis shall have a vehicle identification number that reflects a 2018 model year.

COUNTRY OF SERVICE

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

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

CAB AND CHASSIS LABELING LANGUAGE

The cab and chassis shall include the applicable caution, warning, and safety notice labels with text to be written in English.

APPARATUS TYPE

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

VEHICLE TYPE

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

AXLE CONFIGURATION

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

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GROSS AXLE WEIGHT RATINGS FRONT

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

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

GROSS AXLE WEIGHT RATINGS REAR

The rear gross axle weight rating (GAWR) of the chassis shall be 26,000 pounds.

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

PUMP PROVISION

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

WATER & FOAM TANK CAPACITY

The chassis shall include a carrying capacity of up to 750 gallons (2839 liters). The water and/or foam tank(s) shall be supplied and installed by the apparatus manufacturer.

CAB STYLE

The cab shall be a custom, fully enclosed, LFD model with a 10.00 inch raised roof over the driver, officer, and crew area, designed and built specifically for use as an emergency response vehicle by a company specializing in cab and chassis design for all emergency response applications. The cab shall be designed for heavy-duty service utilizing superior strength and capacity for the application of protecting the occupants of the vehicle. This style of cab shall offer up to ten (10) seating positions.

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

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

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

The cab shall be constructed of 5052-H32 corrosion resistant aluminum plate. The cab shall incorporate tongue and groove fitted 6061-T6 0.13 & 0.19 inch thick aluminum extrusions for

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extreme duty situations. A single formed, one (1) piece extrusion shall be used for the "A" pillar, adding strength and rigidity to the cab as well as additional roll-over protection. The cab side walls and lower roof skin shall be 0.13 inch thick; the rear wall and raised roof skins shall be 0.09 inch thick; the front cab structure shall be 0.19 inch thick.

The exterior width of the cab shall be 94.00 inches wide with a minimum interior width of 88.00 inches. The overall cab length shall be 144.60 inches with 67.50 inches from the centerline of the front of the axle to the back of the cab.

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

The cab shall offer an interior height of 57.50 inches from the front floor to the headliner and a rear floor to headliner height of 65.00 inches in the raised roof area, at a minimum. The cab shall offer an interior measurement at the floor level from the rear of the engine tunnel to the rear wall of the cab of 65.38 inches. All interior measurements shall include the area within the interior trimmed surfaces and not to any unfinished surface.

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

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

The first step for the driver and officer area shall measure approximately 11.50 inches deep X 31.13 inches wide. The intermediate step shall measure approximately 8.50 inches deep X 32.50 inches wide. The height from the first step to the intermediate step and the intermediate step to the cab floor shall not exceed 11.00 inches.

The first step for the crew area shall measure approximately 11.50 inches deep X 20.44 inches wide. The intermediate step shall measure approximately 10.25 inches deep X 22.75 inches wide. The height from the first step to the intermediate step and the intermediate step to the cab floor shall not exceed 12.80 inches.

CAB FRONT FASCIA

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

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

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

FRONT GRILLE

The front fascia shall include a box style, 304 stainless steel front grille 44.45 inches wide X 33.50 inches high X 1.50 inches deep. The grille shall include a minimum free air intake of 732.00 square inches.

CAB UNDERCOAT

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

CAB SIDE DRIP RAIL

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

CAB PAINT EXTERIOR

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

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

The entire cab shall then be coated with an intermediate solid or epoxy surfacing agent that is designed to fill any minor surface defects, provide an adhesive bond between the primer and the paint and improve the color and gloss retention of the color. The finish to this procedure shall be a sanding of the cab with 360 grit paper followed by sealing the seams with SEM brand seam sealer.

The cab shall then be painted the specific color designated by the customer with an acrylic urethane type system designed to retain color and resist acid rain and most atmospheric chemicals found on the fire ground or emergency scene. The paint shall have a minimum thickness of 2.00 mils, followed by a clear top coat not to exceed 2.00 mils. The entire cab shall then be baked at 180 degrees for one (1) hour to speed the curing process of the coatings.

CAB PAINT MANUFACTURER

The cab shall be painted with PPG Industries paint.

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CAB PAINT PRIMARY/LOWER COLOR

The primary/lower paint color shall be PPG FBCH 926760 red.

CAB PAINT SECONDARY/UPPER COLOR

The secondary/upper paint color shall be PPG FBCH 930818 white.

CAB PAINT EXTERIOR BREAKLINE

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

CAB PAINT PINSTRIPE

Where the upper and lower paint colors meet a temporary 0.50 inch wide black pinstripe shall be applied over this break line to offer a more finished look prior to the final pinstripe being installed by the OEM.

CAB PAINT WARRANTY

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

CAB PAINT INTERIOR

The visible interior cab structure surfaces shall be painted with a multi-tone onyx black texture finish.

CAB ENTRY DOORS

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

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

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

CAB ENTRY DOOR TYPE

All cab entry doors shall be barrier clear design resulting in exposed lower cab steps. The doors shall provide approximately 32.00 inches of clearance from the ground to the bottom of the door

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so cab doors may be opened un-hindered by most obstacles encountered, such as guard rails along interstate highways.

Entry doors shall include Pollak mechanical plunger style switches for electrical component activation.

CAB INSULATION

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

LH EXTERIOR REAR COMPARTMENT

The cab shall offer an exterior compartment on the left side of the cab behind the rear door. The compartment opening shall be 10.00 inches wide X 31.19 inches high. The compartment size shall be 11.34 inches wide X 31.19 inches high X 21.19 inches deep. The compartment shall have a 10.63 inch wide, 32.00 inch high and 1.50 inch thick hinged box pan style flush mount door with a bright aluminum tread plate inner panel and a bent D-ring slam latch. There shall be a switch to activate a light inside the compartment and the open compartment warning light in the cab in the event the door is left ajar.

LEFT HAND EXTERIOR REAR COMPARTMENT LIGHTING

There shall be one (1) On-Scene brand Access LED strip light installed to illuminate the exterior rear compartment on the left side of the cab. The strip light shall be 10.00 inches long.

LH EXTERIOR COMPARTMENT INTERIOR FINISH

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

RH EXTERIOR REAR COMPARTMENT

The cab shall offer an exterior compartment on the right side of the cab behind the rear door. The compartment opening shall be 10.00 inches wide X 31.19 inches high. The compartment size shall be 11.34 inches wide X 31.19 inches high X 21.19 inches deep. The compartment shall have a 10.63 inch wide, 32.00 inch high and 1.50 inch thick hinged box pan style flush mount door with a bright aluminum tread plate inner panel and a bent D-ring slam latch. There shall be a switch to activate a light inside the compartment and the open compartment warning light in the cab in the event the door is left ajar.

RIGHT HAND EXTERIOR REAR COMPARTMENT LIGHTING

There shall be one (1) On-Scene brand Access LED strip light installed to illuminate the exterior rear compartment on the right side of the cab. The strip light shall be 10.00 inches in length.

RH EXTERIOR COMPARTMENT INTERIOR FINISH

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

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CAB STRUCTURAL WARRANTY

Summary of Warranty Terms:

THE FOLLOWING IS SUMMARY OF WARRANTY TERMS FOR INFORMATION ONLY. THE ACTUAL LIMITED WARRANTY DOCUMENT, WHICH IS ATTACHED TO THIS OPTION, CONTAINS THE COMPLETE STATEMENT OF THE SPARTAN MOTORS USA LIMITED WARRANTY. SPARTAN'S RESPONSIBILITY IS TO BE ACCORDING TO THE TERMS OF THE COMPLETE LIMITED WARRANTY DOCUMENT.

The cab structure shall be warranted for a period of ten (10) years or one hundred thousand (100,000) miles which ever may occur first. The warranty period shall commence on the date the vehicle is delivered to the first end user.

CAB TEST INFORMATION

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

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

ELECTRICAL SYSTEM

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

MULTIPLEX DISPLAY

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

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

LOAD MANAGEMENT SYSTEM

The apparatus load management shall be performed by the included multiplex system. The multiplex system shall also feature the priority of sequences and shall shed electrical loads based on the priority list specifically programmed.

DATA RECORDING SYSTEM

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

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

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

ACCESSORY POWER

The electrical distribution panel shall include two (2) power studs. The studs shall be size #10 and each of the power studs shall be circuit protected with a fuse of the specified amperage. One (1) power stud shall be capable of carrying up to a 40 amp battery direct load. One (1) power stud shall be capable of carrying up to a 15 amp ignition switched load. The two (2) power studs shall share one (1) #10 ground stud. A 200 amp master switched and fused power and ground stud shall be provided and installed on the chassis near the left hand battery box for OEM body connections.

AUXILIARY ACCESSORY POWER

An auxiliary six (6) position Blue Sea Systems 5025 blade type fuse panel shall be installed behind the switch panel. The fuse panel shall be protected by a 40 amp fuse. The panel shall be capable of carrying up to a maximum 40 amp battery direct load.

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ADDITIONAL ACCESSORY POWER

An additional ten (10) position blade type fuse panel shall be installed behind the officer's seat. The fuse panel shall be protected by a 40 amp fuse located at the batteries. The panel shall be capable of carrying up to a maximum 40 amp battery direct load.

EXTRA ACCESSORY POWER

An extra ten (10) position blade type fuse panel shall be installed behind the forward facing center seat. The fuse panel shall be protected by a 40 amp fuse. The panel shall be capable of carrying up to a maximum 40 amp battery direct load.

EXTERIOR ELECTRICAL TERMINAL COATING

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

ENGINE

The chassis engine shall be a Cummins L9 engine. The L9 engine shall be an in-line six (6) cylinder, four cycle diesel powered engine. The engine shall offer a rating of 450 horse power at 2100 RPM and shall be governed at 2200 RPM. The torque rating shall feature 1250 foot pounds of torque at 1400 RPM with 543 cubic inches (8.9 liters) of displacement.

The L9 engine shall feature a VGT™ Turbocharger, a high pressure common rail fuel system, fully integrated electronic controls with an electronic governor, and shall be EPA certified to meet the 2017 emissions standards using cooled exhaust gas recirculation and selective catalytic reduction technology.

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

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

CAB ENGINE TUNNEL

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

DIESEL PARTICULATE FILTER CONTROLS

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

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ENGINE PROGRAMMING HIGH IDLE SPEED

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

ENGINE HIGH IDLE CONTROL

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

ENGINE PROGRAMMING ROAD SPEED GOVERNOR

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

AUXILIARY ENGINE BRAKE

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

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

AUXILIARY ENGINE BRAKE CONTROL

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

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

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

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ELECTRONIC ENGINE OIL LEVEL INDICATOR

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

FLUID FILLS

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

ENGINE DRAIN PLUG

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

ENGINE WARRANTY

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

REMOTE THROTTLE CONTROL

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

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

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

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

REMOTE THROTTLE HARNESS

An apparatus interface wiring harness for the engine shall be supplied with the chassis. The harness shall include a connector for connection to the chassis harness which shall terminate in the left frame rail behind the cab for reconnection by the apparatus builder. The harness shall contain connectors for a Fire Research In Control 300/400 pressure governor and a multiplexed gauge. Separate circuits shall be included for pump controls, "Pump Engaged" and "OK to Pump" indicator lights, open compartment ground, start signal, park brake ground, ignition signal, master power, customer ignition, air horn solenoid switch, high idle switch and high idle indication light. The harness shall contain interlocks that will prevent shifting to road or pump mode unless the transmission output speed translates to less than 1 mph and the transmission is in neutral. The shift to pump mode shall also require the park brake be set. The harness shall be designed for a top mount pump panel.

An apparatus interface wiring harness shall also be included which shall be wired to the cab harness interface connectors and shall incorporate circuits with relays to control pump

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functions. This harness shall control the inputs for the transmission lock up circuits, governor/hand throttle controls and dash display which shall incorporate "Pump Engaged" and "OK to Pump" indicator lights. The harness shall contain circuits for the apparatus builder to wire in a pump switch.

ENGINE PROGRAMMING REMOTE THROTTLE

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

ENGINE PROGRAMMING IDLE SPEED

The engine low idle speed will be programmed at 750 rpm.

ENGINE FAN DRIVE

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

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

ENGINE COOLING SYSTEM

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

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

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

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

The cooling system shall be equipped with a surge tank that is capable of removing entrained air from the system. The surge tank shall be equipped with a low coolant probe and rearward oriented sight glass to monitor the level of the coolant. The surge tank shall have a dual seal

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cap that meets the engine manufacturer's pressure requirements, and allows for expansion and recovery of coolant into a separate integral expansion chamber.

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

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

The radiator and charge air cooler shall be removable through the bottom of the chassis.

ENGINE COOLING SYSTEM PROTECTION

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

ENGINE COOLANT

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

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

ELECTRONIC COOLANT LEVEL INDICATOR

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

ENGINE PUMP HEAT EXCHANGER

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

COOLANT HOSES

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

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ENGINE AIR INTAKE

The engine air intake system shall include an ember separator air intake filter which shall be located behind the right hand side headlamp. This filter ember separator shall be designed to protect the downstream air filter from embers, using a combination of unique flat and crimped metal screens packaged in a corrosion resistant heavy duty galvanized steel frame. This multilayered screen shall be design traps embers and allows them to burn out before passing through the pack.

The engine air intake system shall also include a stainless steel air cleaner mounted to the frame and located beneath the cab on the right side of the vehicle. The air cleaner shall utilize a replaceable filter element designed to prevent dust and debris from being ingested into the engine. The air cleaner housing and connections in the air intake system shall be designed to mitigate water intrusion into the system during severe weather conditions.

The air intake system shall also include a restriction indicator light in the warning light cluster on the instrument panel, which shall activate when the air cleaner element requires replacement.

AIR INTAKE PROTECTION

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

ENGINE EXHAUST SYSTEM

The exhaust system shall include an end-in end-out horizontally mounted single module after treatment device, downpipe from the charge air cooled turbo. The single module shall include four temperature sensors, diesel particulate filter (DPF), urea dosing module (UL2), and a selective catalytic reduction (SCR) catalyst to meet current EPA standards. The selective catalytic reduction catalyst utilizes a diesel exhaust fluid solution consisting of urea and purified water to convert NOx into nitrogen, water, and trace amounts of carbon dioxide. The solution shall be mixed and injected into the system through the between the DPF and SCR.

The system shall utilize 0.07 inch thick stainless steel exhaust tubing between the engine turbo and the DPF. Zero leak clamps seal all system joints between the turbo and DPF.

The single module after treatment through the end of the tailpipe shall be connected with zero leak clamps. The discharge shall terminate horizontally on the right side of the vehicle ahead of the rear tires.

The exhaust system after treatment module shall be mounted below the frame in the outboard position.

DIESEL EXHAUST FLUID TANK

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

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

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

ENGINE EXHAUST ACCESSORIES

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

ENGINE EXHAUST WRAP

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

TRANSMISSION

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

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

The transmission gear ratios shall be:

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

TRANSMISSION MODE PROGRAMMING

The transmission, upon start-up, will select the fifth speed operation without the need to press the mode button.

TRANSMISSION FEATURE PROGRAMMING

The Allison Gen V-E transmission EVS group package number 127 shall contain the 198 vocational package in consideration of the duty of this apparatus as a pumper. This package shall incorporate an automatic neutral with selector override. This feature commands the

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transmission to neutral when the park brake is applied, regardless of drive range requested on the shift selector. This requires re-selecting drive range to shift out of neutral for the override.

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

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

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

ELECTRONIC TRANSMISSION OIL LEVEL INDICATOR

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

TRANSMISSION SHIFT SELECTOR

An Allison pressure sensitive range selector touch pad shall be provided and located to the right of the driver within clear view and easy reach. The shift selector shall have a graphical Vacuum Florescent Display (VFD) capable of displaying two lines of text. The shift selector shall provide mode indication and a prognostic indicator (wrench symbol) on the digital display. The prognostics monitor various operating parameters and shall alert you when a specific maintenance function is required.

TRANSMISSION PRE-SELECT WITH AUXILIARY BRAKE

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

TRANSMISSION COOLING SYSTEM

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

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TRANSMISSION DRAIN PLUG

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

TRANSMISSION WARRANTY

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

PTO LOCATION

The transmission shall have two (2) power take off (PTO) mounting locations, one (1) in the 8:00 o'clock position and one (1) in the 4:00 o'clock position.

DRIVELINE

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

MIDSHIP PUMP / GEARBOX

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

MIDSHIP PUMP / GEARBOX MODEL

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

MIDSHIP PUMP GEARBOX DROP

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

MIDSHIP PUMP RATIO

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

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

The midship pump shall be located so the dimension from the centerline of the suction to the centerline of the rear axle is 91.50 inches.

PUMP SHIFT CONTROLS

One (1) air pump shift control panel shall be located in the left hand side knee area below the dash. The following shall be provided on the panel: a three (3) position control lever; an engraved PUMP ENGAGED identification light; and an engraved OK TO PUMP identification light. The pump shift control panel shall be black with a yellow border outline and shall include

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pump instructions. An instruction plate describing the transmission shift selector position used for pumping shall be provided and located so it can be read from the driver's position per NFPA **16.10.1.3**. The road mode shall be selected when the control lever is in the up position and pump mode shall be selected when the control lever is in the down position.

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

PUMP SHIFT CONTROL PLUMBING

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

FUEL FILTER/WATER SEPARATOR

The fuel system shall have a Fleetguard FS1098 fuel filter/water separator as a primary filter. The fuel filter shall have a drain valve.

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

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

FUEL LINES

The fuel system supply and return lines installed from the fuel tank to the engine shall be black textile braided lines which are reinforced with braided high tensile steel wire. The fuel lines shall be connected with reusable steel fittings.

ELECTRIC FUEL PRIMER

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

FUEL TANK

The fuel tank shall have a capacity of sixty-eight (68) gallons and shall measure 35.00 inches in width X 17.00 inches in height X 29.00 inches in length.

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

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

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

FUEL TANK MATERIAL AND FINISH

The fuel tank shall be constructed of 12 gauge aluminized steel. The exterior of the tank shall be powder coated black and then painted to match the frame color.

All powder coatings, primers and paint shall be compatible with all metals, pretreatments and primers used. The cross hatch adhesion test per ASTM D3359 Method B, results to be 5B minimum. The pencil hardness test per ASTM D3363 shall have a final post-cured pencil hardness of H-2H. The direct impact resistance test per ASTM D2794, results to be 5B minimum.

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

FUEL TANK STRAP MATERIAL

The fuel tank straps shall be constructed of ASTM A-36 steel. The fuel tank straps shall be powder coated black and then painted to match the frame color if applicable.

FUEL TANK FILL PORT

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

A 1.50 inch diameter hole shall be provided in the left and right frame rails for vent hose routing provisions. The holes shall be located adjacent to the fuel tank and 5.13 inches up from the bottom of each rail.

FUEL TANK SERVICEABILITY PROVISIONS

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

FUEL TANK DRAIN PLUG

A 0.5 inch NPT drain plug shall be centered in the bottom of the fuel tank.

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FRONT AXLE

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

FRONT AXLE WARRANTY

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

FRONT WHEEL BEARING LUBRICATION

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

FRONT SHOCK ABSORBERS

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

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

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

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

FRONT SUSPENSION

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

STEERING COLUMN/ WHEEL

The cab shall include a Douglas Autotech steering column which shall include a seven (7) position tilt, a 2.25 inch telescopic adjustment, and an 18.00 inch, four (4) spoke steering wheel

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

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

ELECTRONIC POWER STEERING FLUID LEVEL INDICATOR

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

POWER STEERING PUMP

The hydraulic power steering pump shall be a TRW PS and shall be gear driven from the engine. The pump shall be a balanced, positive displacement, sliding vane type. The power steering system shall include an oil to air passive cooler.

FRONT AXLE CRAMP ANGLE

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

POWER STEERING GEAR

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

CHASSIS ALIGNMENT

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

REAR AXLE

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

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

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

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REAR AXLE DIFFERENTIAL LUBRICATION

The rear axle differential shall be lubricated with oil.

REAR AXLE WARRANTY

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

REAR WHEEL BEARING LUBRICATION

The rear axle wheel bearings shall be lubricated with oil.

VEHICLE TOP SPEED

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

REAR SUSPENSION

The single rear axle shall feature a Reyco 79KB vari-rate, self-leveling captive slipper type parabolic five (5) leaf spring pack suspension with 57.50 inch X 3.00 inch springs. The suspension shall also utilize one (1) adjustable and one (1) fixed torque rod.

The rear suspension capacity shall be rated from 21,000 to 26,000 pounds.

FRONT TIRE

The front tires shall be Goodyear 385/65R-22.5 18PR "J" tubeless radial G296 MSA mixed service tread.

The front tire stamped load capacity shall be 18,740 pounds per axle with a nominal speed rating of 68 miles per hour when properly inflated to 120 pounds per square inch.

The Goodyear Intermittent Service Rating maximum load capacity shall be 20,050 pounds per axle with a speed rating of 68 miles per hour when properly inflated to 120 pounds per square inch.

The Goodyear Intermittent Service Rating maximum speed capacity shall be 18,740 pounds per axle with a speed rating of 75 miles per hour when properly inflated to 120 pounds per square inch.

The Goodyear Intermittent Service Rating limits the operation of the emergency vehicle to no more than fifty (50) miles of continuous operation under maximum recommended payload, or without stopping for at least twenty (20) minutes. The emergency vehicle must reduce its speed to no more than 50 MPH after the first fifty (50) miles of travel.

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REAR TIRE

The rear tires shall be Goodyear 315/80R-22.5 20PR "L" tubeless radial G751 MSA mixed service tread.

The rear tire stamped load capacity shall be 33,080 pounds per axle with a nominal speed rating of 68 miles per hour when properly inflated to 130 pounds per square inch.

The Goodyear Intermittent Service Rating maximum load capacity shall match the stamped load rating.

The Goodyear Intermittent Service Rating maximum speed capacity shall be 33,080 pounds per axle with a speed rating of 75 miles per hour when properly inflated to 130 pounds per square inch.

The Goodyear Intermittent Service Rating limits the operation of the emergency vehicle to no more than fifty (50) miles of continuous operation under maximum recommended payload, or without stopping for at least twenty (20) minutes. The emergency vehicle must reduce its speed to no more than 50 MPH after the first fifty (50) miles of travel.

REAR AXLE RATIO

The rear axle ratio shall be 5.13:1.

TIRE PRESSURE EQUALIZATION SYSTEM

There shall be a voucher provided with the chassis for Crossfire dual tire equalization system provided on both sets of dual tires on the rear axle. The Crossfire pressure system shall equalize and monitor tire pressure through the valve which is mounted between the dual tires. This shall bolt easily to the drive axle end allowing air to flow freely from one tire to the other, maintaining equal tire pressure and load distribution. The Crossfire system shall maximize tire life, decrease rolling resistance for increased fuel mileage and improve stability braking and overall safety.

The Crossfire dual tire equalization system shall be redeemed upon the vehicle manufacture's receipt of the voucher along with the vehicle in-service weight for each axle.

TIRE PRESSURE INDICATOR

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

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

FRONT WHEEL

The front wheels shall be Alcoa hub piloted, 22.50 inch X 12.25 inch LvL One™ polished aluminum wheels. The hub piloted mounting system shall provide easy installation and shall

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include two-piece flange nuts. The wheels shall feature one-piece forged strength and shall include Alcoa's Dura-Bright® finish with XBR technology as an integral part of the wheel surface. Alcoa Dura-Bright® wheels keep their shine without polishing. Brake dust, grime and road debris are easily removed by simply cleaning the wheels with soap and water.

REAR WHEEL

The rear wheels shall be Alcoa hub piloted, heavy duty, 22.50 inch X 9.00 inch LvL One™ polished aluminum wheels with Alcoa Dura-Bright® wheel treatment with XBR® technology as an integral part of the wheel. The hub piloted mounting system shall provide easy installation and shall include two-piece flange nuts.

BALANCE WHEELS AND TIRES

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

WHEEL TRIM

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

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

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

AUXILIARY LUBRICATION SYSTEM

An SKF centralized lubrication system (formerly Vogel) shall be installed on the chassis. The system shall be capable of lubricating up to twenty-four (24) grease points on the chassis. The grease lines shall be black textile braid covered high tensile steel reinforced wire braided hose with steel reusable fittings. A system diagnostic indicator light shall be provided on the dash. A park brake interlock is incorporated into the ignition system to keep the system from operating while parked. The main line system shall be monitored via a pressure switch. The system shall be mounted on the left hand frame rail.

BRAKE SYSTEM

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

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

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

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

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

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

FRONT BRAKES

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

REAR BRAKES

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

PARK BRAKE

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

PARK BRAKE CONTROL

A Meritor-Wabco manual hand control push-pull style valve shall operate the parking brake.

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The parking brake actuation valve shall be mounted to the left side of the engine tunnel integrated into the transmission shift pod console within easy access of the driver.

AIR DRYER

The brake system shall include a Wabco System Saver 1200 air dryer with an integral heater with a Metri-Pack sealed connector. The air dryer incorporates an internal turbo cutoff valve that closes the path between the air compressor and air dryer purge valve during the compressor "unload" cycle. The turbo cutoff valve allows purging of moisture and contaminants without the loss of turbo boost pressure. The air dryer shall be mounted behind the battery box on the left hand side.

FRONT BRAKE CHAMBERS

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

REAR BRAKE CHAMBERS

The rear axle shall include TSE 24/30 H.O.T. (High Output Technology) brake chambers shall convert the energy of compressed air into mechanical force and motion. This shall actuate the brake camshaft, which in turn shall operate the foundational brake mechanism forcing the brake pads against the brake rotor.

AIR COMPRESSOR

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

AIR GOVERNOR

An air governor shall be provided to control the cut-in and cut-out pressures of the engine mounted air compressor. The governor shall be calibrated to meet FMVSS requirements. The air governor shall be located on the air dryer bracket on the left frame rail behind the battery box.

AUXILIARY AIR RESERVOIR

One (1) auxiliary air reservoir with a 2084 cubic inch capacity shall be installed on the chassis to act as an additional reserve supply to the air system for air horn, air tool, or other non-service brake use. The reservoir shall be isolated with a 90 PSI pressure protection valve on the reservoir supply side to prevent depletion of the air to the air brake system.

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MOISTURE EJECTORS

Automatic moisture ejectors with a manual drain provision shall be installed on all reservoirs of the air supply system. The manual drain provision shall include an actuation pull cable coiled and tied at each drain valve. The supplied cables when extended shall be sufficient in length to allow each drain to be activated from the side of the apparatus.

AIR SUPPLY LINES

The air system on the chassis outside of the cab shall be plumbed with black textile braid covered high tensile steel reinforced wire braided hose with steel reusable fittings. All air plumbing inside the cab shall be reinforced nylon tubing. All drop hoses shall be fiber reinforced neoprene covered hose.

AIR TANK SPACERS

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

REAR AIR TANK MOUNTING

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

WHEELBASE

The chassis wheelbase shall be 221.00 inches.

REAR OVERHANG

The chassis rear overhang shall be 47.00 inches.

FRAME

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

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

Proposals including heat treated rails shall not be considered. Heat treating frame rails produces rails that are not uniform in their mechanical properties throughout the length of the

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rail. Rails made of high strength, low alloy steel are already at the required yield strength prior to forming the rail.

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

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

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

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

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

FRAME WARRANTY

Summary of Warranty Terms:

THE FOLLOWING IS SUMMARY OF WARRANTY TERMS FOR INFORMATION ONLY. THE ACTUAL LIMITED WARRANTY DOCUMENT, WHICH IS ATTACHED TO THIS OPTION, CONTAINS THE COMPLETE STATEMENT OF THE SPARTAN MOTORS USA LIMITED WARRANTY. SPARTAN'S RESPONSIBILITY IS TO BE ACCORDING TO THE TERMS OF THE COMPLETE LIMITED WARRANTY DOCUMENT.

The frame and cross members shall carry a limited lifetime warranty to the original purchaser. The warranty period shall commence on the date the vehicle is delivered to the first end user.

REAR TOW DEVICE

The frame rails shall contain (6) holes per frame in a pattern specified by the OEM for mounting Spartan ERV tow eyes at the rear of the frame at a location defined by the OEM.

FRAME PAINT

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

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

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

The chassis under carriage consisting of frame, axles, driveline running gear, air tanks and other chassis mounted components shall be painted with gloss black paint. Paint shall be applied prior to airline and electrical wiring installation.

REAR MUD FLAP

The unit shall be equipped with a temporary wooden fender and mud flap assembly for transport to the body manufacturer.

FRONT BUMPER

The chassis shall be equipped with a severe duty front bumper constructed from structural steel channel. The bumper material shall be 0.38 thick ASTM A36 steel which shall measure 12.00 inches high with a 3.05 inch flange and shall be 99.00 inches wide with angled front corners.

The bumper shall be primed and painted as specified.

FRONT BUMPER EXTENSION LENGTH

The front bumper shall be extended approximately 21.00 inches ahead of the cab.

FRONT BUMPER PAINT

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

FRONT BUMPER APRON

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

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

FRONT BUMPER COMPARTMENT CENTER

The front bumper shall include a compartment in the bumper apron located in the center between the frame rails which may be used as a hose well. The compartment shall be constructed of 0.13 inch 5052-H32 grade aluminum and shall include drain holes in the bottom corners to allow excess moisture to escape. The compartment shall be the full size of available space in the apron from the cab fascia to the bumper and 38.00 inches wide X 10.88 inches deep. The clear opening shall be 37.75 inches wide. The compartment shall include a notched cover constructed of 0.19 inch thick bright embossed aluminum tread plate. The notch shall be located in the right front portion of the cover and shall be 4.00 inches in length with a 2.00 inches wide radius.

FRONT BUMPER COMPARTMENT COVER HARDWARE

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The front bumper compartment cover(s) shall include gas cylinder stays which shall hold the cover open. Each cover shall be held in the closed position via a flush push button style latch.

MECHANICAL SIREN

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

MECHANICAL SIREN LOCATION

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

AIR HORN

The chassis shall include two (2) Grover brand Stutter Tone air horns which shall measure 24.50 inches long with a 6.00 inch round flare. The air horns shall be trumpet style with a chrome finish.

AIR HORN LOCATION

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

AIR HORN RESERVOIR

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

ELECTRONIC SIREN SPEAKER

There shall be two (2) Cast Products Inc. model SA4301, 100 watt speakers provided. Each speaker shall measure 6.20 inches tall X 7.36 inches wide X 3.06 inches deep. Each speaker shall include a flat mounting flange which shall be polished aluminum.

ELECTRONIC SIREN SPEAKER LOCATION

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

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FRONT BUMPER TOW HOOKS

Two (2) heavy duty chrome plated tow hooks shall be installed below the front bumper in the forward position, bolted directly to the underside of each chassis frame rail with grade 8 bolts.

CAB TILT SYSTEM

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

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

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

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

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

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

CAB TILT AUXILIARY PUMP

A manual cab tilt pump module shall be attached to the cab tilt pump housing.

CAB TILT LIMIT SWITCH

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

CAB TILT CONTROL RECEPTACLE

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

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

CAB WINDSHIELD

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

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

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

GLASS FRONT DOOR

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

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

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

GLASS TINT FRONT DOOR

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

GLASS REAR DOOR RH

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

GLASS TINT REAR DOOR RIGHT HAND

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

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GLASS REAR DOOR LH

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

GLASS TINT REAR DOOR LEFT HAND

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

GLASS SIDE MID RH

The cab shall include a window on the right side behind the front and ahead of the crew door which shall measure 16.00 inches wide X 26.00 inches high. This window shall be fixed within this space and shall be rectangular in shape. The window shall be mounted using self locking window rubber. The glass utilized for this window shall include a green automotive tint unless otherwise noted.

GLASS TINT SIDE MID RIGHT HAND

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

GLASS SIDE MID LH

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

GLASS TINT SIDE MID LEFT HAND

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

CLIMATE CONTROL

A ceiling mounted combination defroster and cabin heating and air conditioning system shall be located above the engine tunnel area. The system covers and plenums shall be of sever duty design made of aluminum which shall be coated with a customer specified interior paint. The design of the system's covers shall provide quick access to washable air intake filters as well as easy access to other serviceable items.

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The air delivery plenums provide targeted airflow directly to the vehicle occupants. Six (6) adjustable louvers will provide comfort for the front seat occupants and ten (10) adjustable louvers will provide comfort for the rear crew occupants.

The system shall be capable of producing up to 12 FPM of air velocity at all occupant seating positions. Separate front and rear blower motors shall be of brushless design and shall be controlled independently. It shall be capable of reducing the interior cabin air temperature from 122° F (+/- 3° F) to 80° F in thirty minutes with 50% relative humidity and full solar load as described in SAE J2646.

The system shall also provide heater pull up performance which meets or exceeds the performance requirements of SAE J1612 as well as defrost performance that meets or exceeds the performance requirements of SAE J381.

A gravity drain system shall be provided that is capable of evacuating condensate from the vehicle while on a slope of up to a 13% grade in any direction.

The air conditioning system plumbing shall be a mixture of custom bent zinc coated steel fittings and Aeroquip GH134 flexible hose with Aeroquip EZ-Clip fittings.

The overhead heater/defroster plumbing shall include an electronic flow control valve that re-directs hot coolant away from the evaporator, via a bypass loop, as the temperature control is moved toward the cold position.

Any component which needs to be accessed to perform system troubleshooting shall be accessible by one person using basic hand tools. Regularly serviced items shall be replaceable by one person using basic hand tools.

***Performance data is based on testing performed by an independent third party test facility using a medium four-door 10" Raised roof Gladiator chassis equipped with an ISL engine.*

CLIMATE CONTROL DRAIN

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

CLIMATE CONTROL ACTIVATION

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

HVAC OVERHEAD COVER PAINT

The overhead HVAC cover shall be painted with a multi-tone onyx black texture finish.

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A/C CONDENSER LOCATION

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

A/C COMPRESSOR

The air-conditioning compressor shall be a belt driven, engine mounted compressor. The compressor shall be compatible with R134-a refrigerant.

UNDER CAB INSULATION

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

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

The engine tunnel insulation shall measure approximately 0.75 inch thick including a vertically lapped polyester fiber layer, a 1.0 lb/ft² PVC barrier layer, an open cell foam layer, and a moisture and heat reflective foil facing reinforced with a woven fiberglass layer. The foil surface acts as protection against moisture and other contaminants. The insulation shall meet or exceed FMVSS 302 flammability test.

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

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

INTERIOR TRIM FLOOR

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

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INTERIOR TRIM

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

REAR WALL INTERIOR TRIM

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

HEADER TRIM

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

TRIM CENTER DASH

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

TRIM LH DASH

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

TRIM RH DASH

The right hand dash trim shall be constructed of 5052-H32 Marine Grade, 0.13 of an inch thick aluminum plate and shall include a Mobile Data Terminal (MDT) provision.

ENGINE TUNNEL TRIM

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

POWER POINT DASH MOUNT

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

The cab shall also include two (2) Dual universal serial bus (USB) charging receptacles in the cab dash rocker switch cutout to provide a power source for USB chargeable electrical equipment. Each USB receptacle shall include one (1) USB port capable of a 5 Volt-1 amp

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output and one (1) USB port capable of a 5 Volt-2.1 amp output. The receptacles shall be wired battery direct and include a backlit legend.

AUXILIARY POWER POINT MID CREW

The cab interior shall include two (2) universal serial bus (USB) charging receptacles to provide a power source for USB chargeable electrical equipment. Each USB receptacle shall include one (1) USB port capable of a 12 watt 2.4 amp fast charge output. Each USB receptacle shall be located in the mid crew area. One (1) receptacle shall be temporarily located under right hand mid side window location and one (1) receptacle shall be temporarily located under the left hand mid side window location. The receptacles shall be connected directly to the batteries. Four (4) feet of additional wire shall be looped at these locations for relocation of the power point by the body builder.

STEP TRIM

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

STEP TRIM KICKPLATE

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

UNDER CAB ACCESS DOOR

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

INTERIOR DOOR TRIM

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

DOOR TRIM KICKPLATE

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

DOOR TRIM CUSTOMER NAMEPLATE

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

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CAB DOOR TRIM REFLECTIVE

In accordance with the current standards of NFPA, the body builder shall provide 96.00 square inches of reflective material on the interior of each cab door.

INTERIOR GRAB HANDLE "A" PILLAR

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

INTERIOR GRAB HANDLE FRONT DOOR

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

INTERIOR GRAB HANDLE REAR DOOR

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

INTERIOR SOFT TRIM COLOR

The cab interior soft trim surfaces shall be black in color.

INTERIOR TRIM SUN VISOR

The header shall include two (2) sun visors, one (1) on each side forward of the driver and officer seating positions above the windshield. The sun visors shall be constructed of impact resistant, transparent acrylic polycarbonate sun visors with a smoke gray tint.

The see thru visors are designed for maximum flexibility of positioning utilizing an arm with virtually unlimited adjustability with lateral travel of the tinted visor at the end of the arm which can be locked in place by a thumbscrew.

The visors are easily adjusted and can be placed into a chosen position with one hand. The sun visors will help protect vehicle occupants from solar glare without obscuring their vision.

INTERIOR FLOOR MAT COLOR

The cab interior floor mat shall be black in color.

CAB PAINT INTERIOR

The inner door panel surfaces shall feature a black Spar-Liner spray on bedliner coating.

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HEADER TRIM INTERIOR PAINT

The metal surfaces in the header area shall be coated with multi-tone onyx black texture finish.

TRIM CENTER DASH INTERIOR PAINT

The entire center dash shall be coated with multi-tone onyx black texture finish. Any accessory pods attached to the dash shall also be painted this color.

TRIM LH DASH INTERIOR PAINT

The left hand dash shall be painted with a multi-tone onyx black texture finish.

TRIM RIGHT HAND DASH INTERIOR PAINT

The right hand dash shall be painted with multi-tone onyx black texture finish.

DASH PANEL GROUP

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

SWITCHES CENTER PANEL

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

SWITCHES LEFT PANEL

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

A rocker switch with a blank legend installed directly above shall be provided for this position if not designated by a specific option. The non-designated switch shall be a two-position, black switch with a green indicator light. The blank switch legend can be custom engraved by the body manufacturer. The switch legend shall have backlighting provided.

SWITCHES RIGHT PANEL

The right dash panel shall include seven (7) rocker switch positions in a three (3) over three (3) switch configuration plus (1) configuration.

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

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SEAT BELT WARNING

A Weldon seat belt warning system, integrated with the Vehicle Data Recorder system, shall be installed for each seat within the cab. The system shall provide a visual warning indicator in the Vista display and control screen(s) and a fast tone audible alarm. The wiring connections at each seat shall have heat shrink tubing applied so that the wiring cannot be easily disconnected to disable the system.

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

SEAT MATERIAL

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

SEAT COLOR

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

SEAT BACK LOGO

The seat backs shall include the logo for the League City Fire Department of League City, Texas. The logo shall be centered on the standard headrest of the seat back and on the left side of a split headrest.

SEAT DRIVER

The driver's seat shall be an H.O. Bostrom 400 Series Firefighter Sierra model seat. The seat shall feature eight-way electric positioning. The eight positions shall include up and down, fore and aft with 8.00 inches of travel, back angle adjustment and seat rake adjustment. The seat shall feature integral springs to isolate shock.

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

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

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

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

SEAT BACK DRIVER

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

SEAT MOUNTING DRIVER

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

SEAT OFFICER

The officer's seat shall be a H.O. Bostrom 400 Series Firefighter series. The seat shall feature a tapered and padded seat, and cushion. The seat shall be a non-adjustable type seat.

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

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

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

SEAT BACK OFFICER

The officer's seat back shall include an IMMI brand SmartDock® Gen 2 hands-free self contained breathing apparatus (SCBA) holder. The hands-free holder shall meet NFPA 1901-03 9G dynamic requirements for cylinder restraint systems for use in crew compartments of emergency response vehicles. The bracket shall accommodate and secure most types of self-contained breathing apparatus cylinders.

The hands-free holder shall consist of a back plate, bottom cradle, non-marring top claws, and claw height adjustment knob. The height adjustment knob shall allow for easy adjustment of the

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claws to the SCBA. The hands-free holder's claws shall lock from inertial forces to prevent the SCBA from becoming a projectile in the event of a crash to meet the NFPA 1901-03 standard for SCBA retention. The SCBA holder shall offer single-motion insertion into the claws and hands-free release when the SCBA fitted seat occupant rises.

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

SEAT MOUNTING OFFICER

The officer's seat shall offer a special mounting position which is 2.00 inches rearward of the standard location offering increased leg room for the occupant.

POWER SEAT WIRING

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

SEAT BELT ORIENTATION CREW

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

SEAT REAR FACING OUTER LOCATION

The crew area shall include one (1) rear facing crew seat located directly behind the right side front seat.

SEAT CREW REAR FACING OUTER

The crew area shall include a seat in the rear facing outboard position which shall be a H.O. Bostrom 400 Series Firefighter model seat. The seat shall feature a tapered and padded seat, and cushion.

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

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

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

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FMVSS 302, of which decides the burning rate of materials in the occupant compartments of motor vehicles.

SEAT BACK REAR FACING OUTER

The crew area seat backs shall include an IMMI brand SmartDock® Gen 2 hands-free self contained breathing apparatus (SCBA) holder. The hands-free holder shall meet NFPA 1901-03 9G dynamic requirements for cylinder restraint systems for use in crew compartments of emergency response vehicles. The bracket shall accommodate and secure most types of self-contained breathing apparatus cylinders.

The hands-free holder shall consist of a back plate, bottom cradle, non-marring top claws, and claw height adjustment knob. The height adjustment knob shall allow for easy adjustment of the claws to the SCBA. The hands-free holder's claws shall lock from inertial forces to prevent the SCBA from becoming a projectile in the event of a crash to meet the NFPA 1901-03 standard for SCBA retention. The SCBA holder shall offer single-motion insertion into the claws and hands-free release when the SCBA fitted seat occupant rises.

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

SEAT MOUNTING REAR FACING OUTER

The rear facing outer seats shall offer special mounting positions which shall be 2.00 inches towards the rear wall offering additional space between the front seats and the outer rear facing seats.

SEAT FORWARD FACING OUTER LOCATION

The crew area shall include two (2) forward facing outboard seats, which include one (1) located next to the outer wall of the cab on the left side of the cab and one (1) located next to the outer wall on the right side of the cab.

SEAT CREW FORWARD FACING OUTER

The crew area shall include a seat in the forward facing outer position which shall be a H.O. Bostrom 400 Series Firefighter model seat. The seat shall feature a tapered and padded seat back and cushion.

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

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

This model of seat shall have successfully completed the static load tests by FMVSS 207/210. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. This model of

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seat installed in the cab model, as specified, shall have successfully completed the dynamic sled testing using FMVSS 208 as a guide with the following accommodations. In order to reflect the larger size outfitted firefighters, the test dummy used shall be a 95th percentile hybrid III male weighing 225 pounds rather than the 50th percentile male dummy weighing 165 pounds as referenced in FMVSS 208. The model of seats shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which decides the burning rate of materials in the occupant compartments of motor vehicles.

SEAT BACK FORWARD FACING OUTER

The crew area seat backs shall include an IMMI brand SmartDock® Gen 2 hands-free self contained breathing apparatus (SCBA) holder. The hands-free holder shall meet NFPA 1901-03 9G dynamic requirements for cylinder restraint systems for use in crew compartments of emergency response vehicles. The bracket shall accommodate and secure most types of self-contained breathing apparatus cylinders.

The hands-free holder shall consist of a back plate, bottom cradle, non-marring top claws, and claw height adjustment knob. The height adjustment knob shall allow for easy adjustment of the claws to the SCBA. The hands-free holder's claws shall lock from inertial forces to prevent the SCBA from becoming a projectile in the event of a crash to meet the NFPA 1901-03 standard for SCBA retention. The SCBA holder shall offer single-motion insertion into the claws and hands-free release when the SCBA fitted seat occupant rises.

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

SEAT MOUNTING FORWARD FACING OUTER

The forward facing outer seat shall be mounted inboard from the side wall for additional clearance facing the front of the cab.

SEAT FORWARD FACING CENTER LOCATION

The crew area shall include one (1) forward facing center crew seat located directly behind the engine tunnel in the center of the cab.

SEAT CREW FORWARD FACING CENTER

The crew area shall include a seat in the forward facing center position which shall be a H.O. Bostrom 400 Series Firefighter model seat. The seat shall feature a tapered and padded seat, and cushion. The seat shall be mounted in a fixed position.

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

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

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

SEAT BACK FORWARD FACING CENTER

The crew area seat backs shall include an IMMI brand SmartDock® Gen 2 hands-free self contained breathing apparatus (SCBA) holder. The hands-free holder shall meet NFPA 1901-03 9G dynamic requirements for cylinder restraint systems for use in crew compartments of emergency response vehicles. The bracket shall accommodate and secure most types of self-contained breathing apparatus cylinders.

The hands-free holder shall consist of a back plate, bottom cradle, non-marring top claws, and claw height adjustment knob. The height adjustment knob shall allow for easy adjustment of the claws to the SCBA. The hands-free holder's claws shall lock from inertial forces to prevent the SCBA from becoming a projectile in the event of a crash to meet the NFPA 1901-03 standard for SCBA retention. The SCBA holder shall offer single-motion insertion into the claws and hands-free release when the SCBA fitted seat occupant rises.

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

SEAT FRAME FORWARD FACING

The forward facing center seating positions shall include a full width seat frame located and installed at the rear wall. The seat frame shall span the available space on the rear wall. The seat frame shall be 12.38 inches high X 22.00 inches deep. The seat frame shall be constructed of Marine Grade 5052-H32 0.19 inch thick aluminum plate. The seat box shall be painted with the same color as the remaining interior.

SEAT FRAME FORWARD FACING STORAGE ACCESS

There shall be two (2) access points to the storage area centered on the front of the seat frame. Each access point shall be covered by a hinged door to allow access for storage in the seat box.

SEAT MOUNTING FORWARD FACING CENTER

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

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SEAT FRAME EXTERIOR REAR COMPARTMENT ACCESS

The seat frame shall be open to the exterior rear compartment on both the right hand side and the left hand side. This shall allow interior access to the left and right exterior rear compartments.

CAB FRONT UNDERSEAT STORAGE ACCESS

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

SEAT COMPARTMENT DOOR FINISH

All underseat storage compartment access doors shall have a multi-tone onyx black texture finish.

WINDSHIELD WIPER SYSTEM

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

ELECTRONIC WINDSHIELD FLUID LEVEL INDICATOR

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

CAB DOOR HARDWARE

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

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

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

DOOR LOCKS

The cab entry doors shall include a Controller Area Network (CAN) based electronic door lock system which shall include two (2) external keypads, one (1) located on the left side next to the front grab handle and one (1) on the right side next to the front grab handle. There shall be one (1) red rocker switch provided on the inside of each front cab entry door to actuate the cab door locks. Each door lock may also be manually actuated from the inside of the cab by means of a

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red knob located on the paddle handle of the respective door. The electronic door lock system shall include four (4) key fobs for actuation with buttons for cab entry door locks and for compartment door locks.

When the doors are unlocked using the external keypad or the key fobs the interior dome lights shall illuminate and remain on for a period of twenty (20) seconds. The interior dome safety feature shall require the interior lighting power to be battery direct.

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

DOOR LOCK LH REAR CAB COMPARTMENT

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

DOOR LOCK RH REAR CAB COMPARTMENT

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

GRAB HANDLES

The cab shall include one (1) 18.00 inch three-piece knurled aluminum anti-slip exterior grab handle behind each cab door. The Hansen Lit Anti-Slip Rails shall be mounted in bright anodized aluminum 4000 Series II stanchions, complete with weep holes to prevent the buildup of moisture.

The grab rails shall include a 12 volt, 17.00 inch long clear LED light to provide an increased margin of safety for night time cab entry and egress. The lights shall only be activated when the parking brake is set and the ignition is on.

POWER DOOR LOCK COMPARTMENT ACTIVATION

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

AUXILIARY GRAB HANDLE

There shall be a 7.00 inch molded stainless steel grab handle with a bright finish attached to the front fascia of the cab in the center below the windshield. The handle installation shall include steel reinforcement behind the front cab fascia.

REARVIEW MIRRORS

Ramco model 6018-FFHR-750HR bus style mirrors shall be provided. The mirror heads shall be polished cast aluminum and shall measure 9.75 inches wide X 13.00 inches high with an additional top mount convex assembly. The mirrors shall be mounted one (1) on each front cab corner radius below the windshield with 18.00 inch long polished cast aluminum arms.

The mirrors shall feature a remote controlled heated full flat glass and a top mounted remote controlled heated convex glass. The mirror control switches shall be located on top of the shift

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pod, next to the shift tower, within easy reach of the driver. The mirrors shall be manufactured using the finest quality non-glare glass and shall feature a rigid mounting thereby reducing vibration. The mirrors shall be corrosion free under all weather conditions

REARVIEW MIRROR HEAT SWITCH

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

EXTERIOR TRIM REAR CORNER

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

TRIM REAR WALL EXTERIOR

The exterior rear wall of the cab shall include an overlay of 3003-H22 aluminum tread plate which shall be 0.07 inches thick. This overlay shall cover the entire rear wall of the cab.

CAB FENDER

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

MUD FLAPS FRONT

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

CAB EXTERIOR FRONT & SIDE EMBLEMS

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

IGNITION

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

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

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

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BATTERY

The single start electrical system shall include six (6) Harris BCI 31 925 CCA batteries with a 210 minute reserve capacity and 4/0 welding type dual path starter cables per SAE J541.

BATTERY TRAY

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

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

BATTERY BOX COVER

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

BATTERY CABLE

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

BATTERY JUMPER STUD

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

ALTERNATOR

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

BATTERY CONDITIONER

A Kussmaul 35/10 battery conditioner shall be supplied. The battery conditioner shall provide a 35 amp output for the chassis batteries and a 10 amp battery saver output. The battery conditioner shall be mounted in the cab inside the forward facing seat base below the left hand center seat.

BATTERY CONDITIONER DISPLAY

A Kussmaul battery conditioner display shall be supplied. The battery conditioner display shall be mounted in front of the left side door just below the windshield.

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AUXILIARY AIR COMPRESSOR

A Kussmaul Auto Pump 12V air compressor shall be supplied. The air compressor shall be installed behind the officer's seat. The air compressor shall be plumbed to the air brake system to maintain air pressure.

ELECTRICAL INLET

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

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

Amp Draw Reference List:

Kussmaul 1000 Charger - 3.5 Amps

Kussmaul 1200 Charger - 10 Amps

Kussmaul 35/10 Charger - 10 Amps

1000W Engine Heater - 8.33 Amps

1500W Engine Heater - 12.5 Amps

120V Air Compressor - 4.2 Amps

ELECTRICAL INLET LOCATION

An electrical inlet shall be installed on the left hand side of the cab ahead of the front door.

ELECTRICAL INLET CONNECTION

The electrical inlet shall be connected to the battery conditioner.

ELECTRICAL INLET COLOR

The electrical inlet connection shall include a yellow cover.

HEADLIGHTS

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

FRONT TURN SIGNALS

The front fascia shall include two (2) Whelen model M6 4.00 inch X 6.00 inch amber LED turn signals which shall be installed in a chrome housing above and outboard of the front warning and head lamps.

HEADLIGHT LOCATION

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

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SIDE TURN/MARKER LIGHTS

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

MARKER AND ICC LIGHTS

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

HEADLIGHT AND MARKER LIGHT ACTIVATION

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

GROUND LIGHTS

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

LOWER CAB STEP LIGHTS

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

INTERMEDIATE STEP LIGHTS

The intermediate step well area at each door shall include an LED light within a chrome housing. The Egress step lights shall provide visibility to the step well area for the first step exiting the vehicle. The Egress step lights shall activate with Entry step lighting.

UNDER BUMPER LIGHTS

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

ENGINE COMPARTMENT LIGHT

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

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LIGHTBAR PROVISION

There shall be one (1) light bar installed on the cab roof. The light bar shall be provided and installed by Spartan Chassis. The light bar installation shall include mounting and wiring to a control switch on the cab dash.

CAB FRONT LIGHTBAR

The lightbar provisions shall be for one (1) Whelen brand Freedom IV LED lightbar mounted centered on the front of the cab roof. The lightbar shall be 72.00 inches in length. The lightbar shall feature fourteen (14) red LED light modules, two (2) clear and two (2) blue LED light modules. The entire lightbar shall feature a clear lens. The clear lights shall be disabled with park brake engaged. The cable shall exit the lightbar on the right side of the cab.

LIGHTBAR SWITCH

The light bar shall be controlled by a virtual button on the Vista display and control screen. This button shall be clearly labeled for identification.

FRONT SCENE LIGHTS

The front of the cab shall include two (2) Whelen Pioneer model PFS2 contour roof mount scene lights installed on the brow of the cab.

Each lamp head shall have two (2) 12 volt high intensity LED panels. Each lamp head shall include a flood light and a spotlight. Each lamp head shall draw 6.5 amps in flood light mode and 6.3 amps in spotlight mode and generate 16,200 lumens total. Each lamp head shall measure 4.13 inches in height X 14.00 inches in width. The lamp heads shall be powder coated white.

FRONT SCENE LIGHTS ACTIVATION

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

FRONT SCENE LIGHT LOCATION

There shall be two (2) scene lights mounted to the front brow of the cab in the outboard position centered over the outer front marker lights.

SIDE SCENE LIGHTS

The cab shall include two (2) Whelen model Pioneer PFS2 semi-recess mount lights installed one (1) on each side of the cab.

Each lamp head shall have two (2) 12 volt high intensity LED panels. Each lamp head shall include a flood light and a spotlight. Each lamp head shall draw 6.5 amps in flood light mode and 6.3 amps in spotlight mode and generate 16,200 lumens total. Each lamp head shall measure 4.13 inches in height X 14.00 inches in width. Each lamp head shall be mounted within

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a semi-recess 0-degree housing featuring a chrome flange which shall measure 7.92 inches in height X 17.15 inches in width. The lamp heads shall be powder coated white.

SIDE SCENE LIGHT LOCATION

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

ISIDE SCENE ACTIVATION

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

INTERIOR OVERHEAD LIGHTS

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

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

AUXILIARY DOME LIGHT MID CREW

The cab shall include two (2) 7.00 inch LED auxiliary dome lights on the headliner in the middle of the crew area inboard of the outer seats. The lights shall include red lenses. The lights shall be activated by the rear doors and by a single virtual button on the Vista display and control screen which shall also activate any other red auxiliary dome lights in the cab specifying Vista activation.

DO NOT MOVE APPARATUS LIGHT

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

The flashing red light shall be located centered left to right for greatest visibility.

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

MASTER WARNING SWITCH

A master switch shall be included, as a virtual button on the Vista display and control screen which shall be labeled "E Master" for identification. The button shall feature control over all

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devices wired through it. Any warning device switches left in the "ON" position when the master switch is activated shall automatically power up.

HEADLIGHT FLASHER

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

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

HEADLIGHT FLASHER SWITCH

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

INBOARD FRONT WARNING LIGHTS

The cab front fascia shall include two (2) Whelen M6 Super LED front warning lights in the left and right inboard positions. The lights shall feature multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors. The lights shall be mounted to the front fascia of the cab within a chrome bezel

INBOARD FRONT WARNING LIGHTS COLOR

The warning lights mounted on the cab front fascia in the inboard positions shall be red/blue with a clear lens.

OUTBOARD FRONT WARNING LIGHTS

The cab front fascia shall include two (2) Whelen M6 Super LED front warning lights in the left and right outboard positions. The lights shall feature multiple flash patterns including steady burn. The lights shall be mounted to the front fascia of the cab within a chrome bezel. The lights shall be programmed to emit the "PinWheel Variable" non-flashing pattern.

OUTBOARD FRONT WARNING LIGHTS COLOR

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

FRONT WARNING SWITCH

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

INTERSECTION WARNING LIGHTS

The chassis shall include two (2) Whelen M6 series Super LED intersection warning lights, one (1) each side. The lights shall feature multiple flash patterns including steady burn.

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INTERSECTION WARNING LIGHTS COLOR

The intersection lights shall be red/amber with a clear lens.

INTERSECTION WARNING LIGHTS LOCATION

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

SIDE WARNING LIGHTS

The cab sides shall include two (2) Whelen M6 Super LED warning lights, one (1) on each side. The lights shall feature multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors. The lights shall be mounted to the sides of the cab within a chrome bezel.

SIDE WARNING LIGHTS COLOR

The warning lights located on the side of the cab shall be red/amber with a clear lens.

SIDE WARNING LIGHTS LOCATION

The warning lights on the side of the cab shall be mounted above the front doors.

AUXILIARY SIDE WARNING LIGHTS

The cab side shall include an auxiliary set of Whelen series M6 4.00 inch tall X 6.00 inch wide Super LED warning lights, one (1) each side, which shall feature multiple flash patterns including steady burn.

AUXILIARY SIDE WARNING LIGHTS COLOR

The auxiliary warning lights located on the side of the cab shall be split red and blue with a clear lens.

AUXILIARY SIDE WARNING LIGHTS LOCATION

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

ADDITIONAL SIDE WARNING LIGHTS

The cab sides shall include an additional set of Whelen series M6 Super LED 4.00 inch tall X 6.00 inch wide warning lights, one (1) each side, which shall offer multiple flash patterns including steady burn.

ADDITIONAL SIDE WARNING LIGHTS COLOR

The additional warning lights located on the sides of the cab shall be red and amber with a clear lens.

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ADDITIONAL SIDE WARNING LIGHTS LOCATION

The warning lights on the side of the cab shall be mounted behind the rear crew door in the lowest available position.

EXTRA SIDE WARNING LIGHTS

The cab sides shall include an additional set of Whelen series M6 Super LED 4.00 inch tall X 6.00 wide inch warning light, one (1) each side, which shall offer multiple flash patterns including steady burn.

EXTRA SIDE WARNING LIGHTS COLOR

The extra warning lights located on the sides of the cab shall be red and blue with a clear lens.

EXTRA SIDE WARNING LIGHTS LOCATION

The warning lights on the side of the cab shall be mounted behind the rear crew door in the highest position available.

SIDE AND INTERSECTION WARNING SWITCH

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

SIREN CONTROL HEAD

A Whelen 295HFS2 electronic siren control head with remote amplifier shall be provided and flush mounted in the switch panel with a location specific to the customer's needs. The siren shall feature 200-watt output, hands free mode and shall be in "standby" mode awaiting instruction. The siren shall offer radio broadcast, public address, wail, yelp, or piercer tones and hands free operation which shall allow the operator to turn the siren on and off from the horn ring if a horn/siren selector switch option is also selected.

HORN BUTTON SELECTOR SWITCH

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

AIR HORN ACTIVATION

The air horn activation shall be accomplished by the steering wheel horn button for the driver and a momentary rocker switch on the switch panel. An air horn activation circuit shall be provided to the chassis harness pump panel harness connector.

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MECHANICAL SIREN ACTIVATION

The mechanical siren shall be actuated by a Linemaster model SP491-S81 foot switch mounted in the front section of the cab for use by the driver and a momentary rocker switch in the switch panel on the dash. A red momentary siren brake rocker switch shall be provided in the switch panel on the dash. A virtual button for the siren brake shall be provided on the Vista display.

The siren activation shall be interlocked with the park brake and shall only be active when master warning switch is on to prevent accidental engagement.

BACK-UP ALARM

A Preco-Matic model 1059 dual function, dual sound backup alarm shall be installed at the rear of the chassis with an auto-adjusting output level of 87 dB to 112 dB. The alarm shall automatically activate when the transmission is placed in reverse.

INSTRUMENTATION

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

A twenty eight (28) icon lightbar message center with integral LCD odometer/trip odometer shall be included. The odometer shall display up to 999,999.9 miles. The trip odometer shall display 9,999.9 miles. The LCD message center screen shall be capable of custom configuration by the users for displaying certain vehicle status and diagnostic functions.

The instrument panel shall contain the following gauges:

One (1) three-movement gauge displaying vehicle speed, fuel level, and Diesel Exhaust Fluid (DEF) level. The primary scale on the speedometer shall read from 0 to 100 MPH, and the secondary scale on the speedometer shall read from 0 to 160 KM/H. The scale on the fuel and DEF level gauges shall read from empty to full as a fraction of full tank capacity. Red indicator lights in the gauge and an audible alarm shall indicate low fuel or low DEF at 1/8th tank level.

One (1) three-movement gauge displaying engine RPM, and primary and secondary air system pressures shall be included. The scale on the tachometer shall read from 0 to 3000 RPM. The scale on the air pressure gauges shall read from 0 to 150 pounds per square inch (PSI) with a red line zone indicating critical levels of air pressure. Red indicator lights in the gauge and an audible alarm shall indicate low air pressure.

One (1) four-movement gauge displaying engine oil pressure, coolant temperature, voltmeter, and transmission temperature shall be included. The scale on the engine oil pressure gauge shall read from 0 to 100 pounds PSI with a red line zone indicating critical levels of oil pressure. A red indicator light in the gauge and audible alarm shall indicate low engine oil pressure. The scale on the coolant temperature gauge shall read from 100 to 250 degrees Fahrenheit (°F) with a red line zone indicating critical coolant temperatures. A red indicator light in the gauge and audible alarm shall indicate high coolant temperature. The scale on the voltmeter shall read from 9 to 18 volts with a red line zone indicating critical levels of battery voltage. A red indicator

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light in the gauge and an audible alarm shall indicate high or low system voltage. The low voltage alarm shall indicate when the system voltage has dropped below 11.8 volts for more than 120 seconds in accordance with the requirements of NFPA 1901. The scale on the transmission temperature gauge shall read from 100 to 300 degrees °F with a red line zone indicating critical temperatures. A red indicator light in the gauge and an audible alarm shall indicate a high transmission temperature.

The light bar portion of the message center shall include twenty-eight (28) LED backlit indicators. The lightbar shall be split with fourteen (14) indicators on each side of the LCD message screen. The lightbar shall contain the following indicators and produce the following audible alarms when supplied in conjunction with applicable configurations:

RED INDICATORS

Stop Engine - indicates critical engine fault
Air Filter Restricted - indicates excessive engine air intake restriction
Park Brake - indicates parking brake is set
Low Coolant - indicates critically low engine coolant
Cab Tilt Lock - indicates the cab tilt system locks are not engaged.

AMBER INDICATORS

Malfunction Indicator Lamp (MIL) - indicates an engine emission control system fault
Check Engine - indicates engine fault
Check Transmission - indicates transmission fault
Anti-Lock Brake System (ABS) - indicates anti-lock brake system fault
High exhaust system temperature – indicates elevated exhaust temperatures
Water in Fuel - indicates presence of water in fuel filter
Wait to Start - indicates active engine air preheat cycle
Windshield Washer Fluid – indicates washer fluid is low
DPF restriction - indicates a restriction of the diesel particulate filter
Regen Inhibit-indicates regeneration of the DPF has been inhibited by the operator
Range Inhibit - indicates a transmission operation is prevented and requested shift request may not occur.
SRS - indicates a problem in the supplemental restraint system
Check Message - indicates a vehicle status or diagnostic message on the LCD display requiring attention.

GREEN INDICATORS

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

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BLUE INDICATORS

High Beam indicator

AUDIBLE ALARMS

Air Filter Restriction

Cab Tilt Lock

Check Engine

Check Transmission

Open Door/Compartment

High Coolant Temperature

High or Low System Voltage

High Transmission Temperature

Low Air Pressure

Low Coolant Level

Low DEF Level

Low Engine Oil Pressure

Low Fuel

Stop Engine

Water in Fuel

Extended Left/Right Turn Signal On

ABS System Fault

BACKLIGHTING COLOR

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

RADIO

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

The speakers shall be installed inside the cab with two (2) speakers recessed within the headliner of the front of the cab just behind the windshield and two (2) speakers on the upper rear wall of the cab.

AM/FM ANTENNA

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

CAMERA

An Audiovox Voyager heavy duty rearview camera system shall be supplied. One (1) camera with a teardrop shaped chrome plated housing shall be shipped loose for OEM installation in the body to afford the driver a clear view to the rear of the vehicle and one (1) shall be mounted on the officer side of the cab below windshield ahead of the front door at approximately the same level as the cab door handle.

The cameras shall be wired to a single Weldon Vista display located on the driver's side dash. The rear camera shall activate when the transmission is placed in reverse and the right camera

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shall activate with the right side turn signal. Each camera shall also be activated by a button on the Vista display.

COMMUNICATION ANTENNA

An antenna base, for use with an NMO type antenna, shall be mounted on the right hand front corner of the cab roof so not to interfere with light bars or other roof mounted equipment installed by Spartan Chassis. The antenna base shall be an Antenex model MABVT8 made for either a 0.38 inch or 0.75 inch receiving hole in the antenna and shall include 17.00 foot of RG58 A/U cable with no connector at the radio end of the cable. The antenna base design provides the most corrosion resistance and best power transfer available from a high temper all brass construction and gold plated contact design. The antenna base shall be provided by Spartan.

COMMUNICATION ANTENNA CABLE ROUTING

The antenna cable shall be routed from the antenna base mounted on the roof to the area inside the center rocker switch console.

AUXILIARY COMMUNICATION ANTENNA

An auxiliary antenna base, for use with and NMO type antenna, shall be installed on the cab. The antenna base shall be an Antenex model MABVT8 and shall include 17.00 foot of RG58 A/U cable with no connector at the radio end of the cable. The antenna base shall be mounted in the inboard position on the right hand front corner of the cab roof so not to interfere with light bars or other roof mounted equipment installed by Spartan Chassis. The antenna base shall be provided by Spartan.

AUXILIARY COMMUNICATION ANTENNA CABLE ROUTING

The auxiliary antenna cable shall be routed from the antenna base mounted on the roof to the area inside the center rocker switch console.

CAB EXTERIOR PROTECTION

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

FIRE EXTINGUISHER

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

DOOR KEYS

The cab and chassis shall include a total of six (6) door keys for the manual door locks.

WARRANTY

Summary of Warranty Terms:

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THE FOLLOWING IS SUMMARY OF WARRANTY TERMS FOR INFORMATION ONLY. THE ACTUAL LIMITED WARRANTY DOCUMENT, WHICH IS ATTACHED TO THIS OPTION, CONTAINS THE COMPLETE STATEMENT OF THE SPARTAN MOTORS USA LIMITED WARRANTY. SPARTAN'S RESPONSIBILITY IS TO BE ACCORDING TO THE TERMS OF THE COMPLETE LIMITED WARRANTY DOCUMENT.

The chassis manufacturer shall provide a limited parts and labor warranty to the original purchaser of the custom built cab and chassis for a period of twenty-four (24) months, or the first 36,000 miles, whichever occurs first. The warranty period shall commence on the date the vehicle is delivered to the first end user.

CHASSIS OPERATION MANUAL

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

ENGINE AND TRANSMISSION OPERATION MANUALS

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

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

CAB/CHASSIS AS BUILT WIRING DIAGRAMS

The cab and chassis shall include two (2) complete sets of wiring schematics and option wiring diagrams. One (1) set shall be a printed hard copy, one (1) set shall be a digital copy.

CUSTOMER INSPECTION

There shall be a customer inspection of the chassis at Spartan Chassis in Charlotte, Michigan. The customer, the dealer, or the OEM shall be responsible for all travel costs and arrangements.

The date of the chassis inspection shall be determined based on the requested chassis completion date, OEM production schedules, the chassis off-line date, and the chassis completion date.

The inspection must be coordinated between the OEM/Dealer representative and Andy Torrence the Spartan Chassis FT Auditor/Inspection Coordinator. Andy can be contacted by phone at 517-543-6400 extension 3148, on his cell at 517-231-0959, or by email to andy.torrence@spartanchassis.com.

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SALES TERMS

The sale of the Spartan Chassis shall be governed by the terms contained on the Sales Terms – Acceptance of Purchase Order document, a copy of which is attached to this option.

DRIVELINE LAYOUT CONFIRMATION

During the design phase of the chassis the Spartan Chassis driveline engineer shall submit the driveline layout to an OEM engineer to review the chassis design for any potential problems integrating the OEM body to the chassis. The OEM engineer shall provide approval to the driveline engineer prior to driveline bills of materials being released.

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.

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.

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Overall Height (feet and inches)

Overall Length (feet and inches)

Overall GVWR (tons or metric tons)

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 forward wall in the right side walkway compartment.

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.

HELMET RESTRAINTS

All NFPA required helmet restraints will be supplied and installed by the Fire Department prior to

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the truck being placed into service.

MUD FLAPS

Heavy-duty rubber mud flaps shall be provided behind the rear 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.

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

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warranty.

PUMP COMPARTMENT WORK LIGHT

Two (2) LED 9.00 inch Tube lights model #RX-15T16-5050-21CM shall be installed in the pump compartment module to illuminate the piping and plumbing components.

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

OPERATORS PANEL

The operators' panel shall be a "top mount", constructed on two (2) incline surfaces.

The lower panel housing shall be used for valve controls. The upper panel housing shall be used for gauges, pump controls and any other activation controls specified.

The valve control levers shall be immediately adjacent to the respective gauges neatly arranged for easy access and visible for the operator.

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 one (1) full length OnScene LED "Access" light.

At each side panel there shall be a .188 inch (4.76 mm) embossed aluminum diamond plate shielded light assembly installed on a stationary surface. Each shield shall contain one (1) full length OnScene LED "Access" light.

PUMP PANEL LIGHT ACTIVATION

The pump panel and side panel lights shall be activated by the setting of the park brake.

SPEEDLAY HOSE BEDS

Two (2) vertically stacked speedlay hose beds shall be provided in the forward portion of the pump compartment module. The speedlay hose beds shall be constructed as an integral part of the pump compartment tubular structure. Stainless steel scuff plates shall be installed at the bottom and at the vertical edges of the crosslay openings to protect the hose and hose ends.

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The speedlay hose beds shall be approximately 12.00 inches tall and wide enough for laying a double stack of each hose size specified in the plumbing specifications.

The speedlay hose beds shall span the entire width of the pump compartment module. Slotted flooring shall be provided for hose area drainage.

PUMP COMPARTMENT SERVICE

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

There shall not be any service access openings provided in this area of the module.

A removable speedlay hose bed tray shall be provided for each bay specified.

PUMP COMPARTMENT WIDTH

The width of the pump compartment (front to back) shall be 61.00 inches (1.52 m).

ALUMINUM WALKWAY WITH EMBOSSED DIAMOND PLATE STEPS

The walkway shall be located between the cab and pump house where flex joints shall be provided between the walkway and pump compartment as well as between walkway and the chassis cab. These flex joints shall be required to reduce the negative effects that chassis frame rail twist can induce into structural components.

The walkway shall be constructed of aluminum tubing to provide a framework for stepping and standing areas.

Each side of the walkway shall have an intermediate step which facilitates access to the walkway standing surface from the running board level. The surface of the walkway, intermediate steps, and running board areas of the walkway shall be constructed of .188 inch embossed aluminum diamond plate.

The running board stepping surface shall overlap the top of the supportive tubular framework. Each surface shall be 'slip-resistant' compliant with the latest NFPA recommendations for stepping and standing surfaces.

WALKWAY WIDTH

The walkway area immediately forward of the pump compartment shall be approximately 21.00 inches in width.

WALKWAY TOOL COMPARTMENTS

Two (2) walkway tool compartments shall be provided, one (1) on each side of the walkway step area. The steps shall be incorporated into hinged 'lift-up' style doors completely enclosing and concealing the integral tool and or equipment storage compartment directly behind the door.

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The doors shall be hinged at the top and open with the assistance of a gas filled cylinders. The cylinder shall also serve as a hold open/close device for ease of operator use and elimination of a mechanical latching system.

There shall be one (1) chrome handle installed horizontally to each door to assist in opening the tool compartment doors.

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.

TOOL COMPARTMENT LIGHTING

Each tool compartment shall be illuminated with one (1) OnScene "Access" 8.00 inch LED Tube light mounted to the forward edge in an aluminum housing. Each light shall be activated when the respective door is open.

WALKWAY TOOL COMPARTMENT MATTING

Turtle Tile matting shall be included on the floor of the walkway tool compartment.

MATTING COLOR

The Matting shall be black in color.

WALKWAY LIGHTING

The pump operator's walkway area shall be illuminated with two (2) OnScene "Access" 8.00 inch LED strip lights installed on the forward face of the pump compartment. The lights shall be mounted in aluminum housing.

The light shall be manufactured by OnScene Solutions with a 5 year replacement warranty.

WALKWAY LIGHTING ACTIVATION

The walkway step lights shall be activated when the park brake is set.

18" KNURLED ALUMINUM ILLUMINATED HANDRAILS

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

There shall be a 2.00 inch 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, current edition, standard requirements.

Two (2) 18" handrails shall be installed on the pump compartment, one (1) each side near the walkway steps to facilitate access up to the operator's panel area.

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

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ILLUMINATED HANDRAIL LIGHTING ACTIVATION

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

MANSAVER BARS

There shall be two (2) Fire Research model MSA110-XXX "ManSaver" safety bars located in the walkway, one (1) each side.

The safety bar shall open either upward or inward and be spring loaded to automatically return to the horizontal closed position. The safety bar assembly shall be made of aluminum and stainless steel with foam padding and a bright yellow cover on the bar. The cover shall be water resistant mildew resistant, and made of reinforced rip stop vinyl.

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.

HINGED RIGHT & LEFT SIDE PUMP PANELS

There shall be two (2) side pump panels on each side of the pump compartment, one upper and one lower. Each panel shall be reinforced with hat channels installed on the backside of the panel to add stiffness.

All panels shall be vertically hinged on the rearward or body side of the panel with a gas shock hold open device installed. All openings shall be accessible by quick-release mechanical type latches closing against a door seal.

When opened; the panels shall provide a large access opening to the pump for ease of serviceability.

The upper panels shall open first and there shall not be a fixed middle sill between the hinged panels.

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".

SOFT SUCTION HOSE STORAGE

There shall be a recessed cavity on the left side of the pump compartment module integrated into the side panel to store a roll of 25 feet of 5.00 inch suction hose. The cavity shall be approximately 10.00 inches (254 mm) wide. The compartment shall have a raw interior finish

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with brushed stainless steel trim provided around the opening. The floor area shall have a light taper downward so assist in restraining the hose. Drain holes shall be provided in the rear corners.

COMPARTMENT LOCATION

The storage cavity shall be located rearward of the steamer inlet on the pump panel.

SOFT SUCTION HOSE STORAGE

There shall be a recessed cavity on the right side of the pump compartment module integrated into the side panel to store a roll of 25' of 5" suction hose. The cavity shall be approximately 10.00 inches (254 mm) wide. The compartment shall have a raw interior finish with brushed stainless steel trim provided around the opening. The floor area shall have a light taper downward so assist in restraining the hose and notched as required for exhaust configurations. Drain holes shall be provided in the rear corners.

COMPARTMENT LOCATION

The storage cavity shall be located forward of the steamer inlet on the pump panel.

RUNNING BOARDS

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

EMBOSSSED ALUMINUM DIAMOND PLATE OVERLAYS

The side running boards shall have a .188 inch (4.76 mm) embossed aluminum diamond plate overlays installed. The stepping areas shall be as large as possible, overlapping the perimeter of the structural running board framework. The embossed aluminum diamond plate material shall meet the minimum NFPA standard requirements for slip resistance.

APPARATUS PLUBMING 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.

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FASTENERS FOR LABELS

All labels that are not installed into discharge handles shall be attached with mechanical fasteners.

BEZELS FOR VALVE CONTROL HANDLES

Deluxe metal bezels shall be supplied around the openings for all valve control handles at the top operator's panel.

Any specified control handle at the side pump panels shall include a mirrored stainless steel bezel around each opening.

BEZELS FOR DISCHARGES AND INLETS

Mirrored stainless steel bezels shall be supplied around the openings in the pump panels for all discharge & suction inlet fittings. Any additional cutouts on the pump panels used for access to pump components, such as manual overrides, shall also have bezels provided.

PRESSURE GOVERNOR

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

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. 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 via the unloader pipe 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 stating "DO NOT CAP" installed.

The relief valve shall have no stainless steel plumbing extension installed.

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.

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TANK LEVEL GAUGE

Fire Research TankVision Pro model WLA400-A00 tank indicator kit shall be installed. 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 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 blue 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. The indicator shall have an output for an audio alarm, warning indicator signal, valve/actuator control signal and an input for a silence button.

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.

AUXILIARY WATER LEVEL GAUGE

TANK LEVEL GAUGE

Fire Research MaxVision model WLA280-A00 tank remote indicator shall be installed. The indicator shall show the volume of water in the tank on Ninety six (96) easy to see super bright Tri-color LEDs. The indicator case shall be waterproof, manufactured of Polycarbonate material with an integrated lens. The package includes a rubber gasket.

The remote indicator shall receive input information over a datalink from a Fire Research TankVision primary indicator. The remote indicator shall indicate the level as a single color in Red for 25% or less, Amber color for up to 50% volume, Blue color for up to 75% volume and Green color for up to 100% volume. When the level reaches 25%, the red LEDs will begin flashing. When the level is empty, the red LEDs will scroll in a down-chasing motion and then flash three times. It shall have the program capability to adjust the brightness level for day time and nighttime viewing.

TANK LEVEL GAUGE LOCATION

The tank level readouts shall be located on the apparatus body, one (1) each high on the pump compartment panels.

AIR HORN BUTTON

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".

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PUMP COMPARTMENT TOP OVERLAY

The top of the pump compartment shall be overlaid with 3/16" embossed aluminum diamond plate, meeting the minimum NFPA standard requirements for slip resistance.

MIDSHIP PUMP

The pump shall have a capacity of 2000 gallons per minute derated to 1500gallons per minute at UL, 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.

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.

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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.

AIR PRIMER SYSTEM

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

All wetted metallic parts of the priming system are to be of brass and stainless steel construction. A single panel mounted control will activate the priming pump and open the priming valve to the pump.

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 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.

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PRIMER CONTROL

There shall be one (1) push button control to actuate the primer control valve at the operator's panel.

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) full flowing Monarch Electric Butterfly valve installed directly to the pump intake manifold and shall be located behind the pump panel, between the main pump body casting and the steamer inlet casting.

The valve shall be electrically controlled.

The control shall include status lights that indicate valve positioning; open, closed, or traversing from one position to another. The valve shall have a manual override control provided and installed in an easily accessible location.

A .25 inch (50.80 mm) 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.

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".

The relief valve shall have no stainless steel plumbing extension installed.

5" STORZ ELBOW & CAP

The inlet shall include the following components:

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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.

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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.

PUMP ANODES

Two (2) pump anodes shall be installed in the plumbing 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"

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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

All manual drains shall be Class One with $\frac{3}{4}$ " 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

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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 3/4 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 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

The foam manifold will be designed to be as large as possible to allow maximum flow capabilities and it will be fed from two separate pump discharges.

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 30 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.

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There will be a 1/4 turn foam valve at the tank.

The foam drain, supply valve and strainer will be accessible through the right side upper panel.

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".

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

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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

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 overfill.

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

LEFT SIDE INLET

There shall be one (1) gated suction inlet with .75 inch (19mm) bleeder installed on the left 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 stainless steel ball.

INTAKE VALVE CONTROL

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

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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.

AUXILIARY RIGHT SIDE INLET

There shall be one (1) auxiliary 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 8000 series swing-out valve with 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 rearward position.

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LEFT SIDE DISCHARGE

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

DISCHARGE VALVE

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

DISCHARGE VALVE CONTROL

The discharge shall be controlled from the pump operator's panel location.

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 swivel by male with 45 degree polished elbow

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

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 4.00 inch (100 mm) Akron Brass 8000 series 'electric valve' with a bronze flat 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.

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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

RIGHT SIDE DISCHARGE

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

DISCHARGE VALVE

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

DISCHARGE VALVE CONTROL

The discharge shall be controlled from the pump operator's panel location.

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 swivel by male with 45 degree polished elbow

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

RIGHT SIDE MASTER DISCHARGE

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

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DISCHARGE VALVE

A 4.00 inch (100 mm) Akron Brass 8000 series 'electric valve' with a bronze flat 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.

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.

DISCHARGE VALVE

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

DISCHARGE VALVE CONTROL

The discharge shall be controlled from the pump operator's panel location.

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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 swivel by male with 45 degree polished elbow

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

FOAM CAPABLE

The discharge shall be foam capable.

RIGHT REAR DISCHARGE

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 8800 series swing-out valve with a stainless steel ball.

DISCHARGE VALVE CONTROL

The discharge shall be controlled from the pump operator's panel location.

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 swivel by male with 45 degree polished elbow

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

FOAM CAPABLE

The discharge shall be foam capable.

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PUMP COMPARTMENT SPEEDLAYS

The speedlay hose beds shall be constructed as an integral part of the pump compartment tubular structure with aluminum slotted flooring provided for hose area drainage.

A removable speedlay hose bed tray shall be provided for each bay specified.

Chicsan swivels shall be installed above each plumbed speedlay hose bed to allow removal of the speedlay trays and accessible enough for hose couplings to be tightened on to chicksans. Chicsan swivels shall swing from left to right to allow attached hose to be deployed from either side.

2" SPEEDLAY

A speedlay with the following specified components shall be provided for up to 200 feet (60 m) of 2.00 inch (44.4 mm) hose.

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

DISCHARGE VALVE

A 2.00 inch (50 mm) Akron Brass 8800 series swing-out valve with a stainless steel ball.

DISCHARGE VALVE CONTROL

The discharge shall be controlled from the pump operator's panel location.

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 chicsan swivel

FOAM CAPABLE

The discharges shall be foam capable.

SPARE SET OF SPEEDLAY TRAYS

There shall be one (1) spare set of removable speedlay hose bed trays provided and shipped loose with the apparatus. The trays shall be fabricated of equal size, material, and finishing appearance as those installed on the apparatus.

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SPEEDLAY TRIM

Mirrored stainless steel trim shall be installed at the openings on each side of the speedlay hose bed area. The trim shall extend 8.00 inches into the speedlay bay opening from the outer edge. The trim shall reduce the chaffing of the hose jacket on the edges of the bay area.

SPEEDLAY HOSE BED HOSE RESTRAINTS

The Dealership shall provide a means of restraining the hose stored in the speedlays to prevent inadvertent deployment of hose during transit.

DECK GUN MONITOR WATERWAY

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

DISCHARGE VALVE

A 4.00 inch (100 mm) Akron Brass valve with a 3.00 inch handwheel control and position indicator.

DISCHARGE PLUMBING

The deluge waterway shall consist of 4.00 inch (100 mm) piping and shall be drained with an auto-drain located at the lowest point of the waterway system if required.

DELUGE PIPE LOCATION

The deluge pipe shall be located in the hose bed dunnage area, toward the left side of the apparatus.

EXTEND-A-GUN-DEALER SUPPLIED

There will be one (1) dealer supplied Task Force Tips RC 18.00 inch (457.2 mm) Extenda-Gun and saddle bracket (if included) installed by Spartan Emergency Response on the deluge pipe.

If the Extenda-Gun/Saddle bracket (if provided) are 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 panel control will be installed on the operators panel.

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 8800 series swing-out valve with a stainless steel ball.

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DISCHARGE VALVE CONTROL

The discharge shall be controlled from the pump operator's panel location.

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.

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 chicsan 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 chicsan swivel to accommodate deployment of hose in different directions.

FRONT BUMPER DISCHARGE CHICKSAN GUARD

The front bumper discharge chicsan shall include a chicsan guard installed on the front bumper gravelshield to prevent the chicsan 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 chicsan.

FOAM CAPABLE

The discharge shall be foam capable.

BOOSTER HOSE REEL

There shall be one (1) Hannay electric rewind booster reel with automatic brake installed on the apparatus. The reel shall have a capacity of 200 foot (60 m) of 800 psi (55 BAR) booster hose.

There shall be a manual rewind device provided. A manual crank shall be mounted adjacent to booster reel.

REEL FINISH

The hose reel specified shall be steel and painted the standard silver utilized by Hannay.

HOSE REEL VALVE

The reel shall be plumbed to the pump with a 1.00 inch (25.40 mm) quarter turn Akron 8810 ball valve and 1.00 inch (25.40 mm) high pressure hose and couplings.

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

REWIND ACTIVATION

An electric rewind switch shall be located adjacent to the booster reel. The switch shall have a weather resistant rubber cover and label denoting its function.

The switch shall be labeled "HOSE REEL".

HOSE REEL LOCATION

The hose reel shall be mounted as high as possible and to the left side on the rear wall of the Rear Center, B-1 compartment.

HOSE REEL ROLLERS

Two (2) stainless steel hose roller guides shall be provided and installed one (1) on either side of the compartment door opening to allow hose deployment without rubbing the apparatus.

BOOSTER REEL GAUGE

There shall be a pressure gauge supplied for the Booster Reel as specified below.

DISCHARGE GAUGES

A Class 1 2.50 inch (65 mm) gauge shall be supplied for reading the pressure of each discharge greater than 1.50 inches (38 mm) in diameter, unless otherwise specified.

The gauge shall be a model LFP220.

GAUGE SCALE

Each gauge shall be marked for reading a pressure range of 0-400 PSI.

GAUGE FACE COLOR

Each gauge shall have black markings on a white face.

TANK TO PUMP LINE

The connection between the tank and the pump shall be capable of the flow recommendations as set forth in NFPA Pamphlet 1901, latest revision 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.

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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

A 3.50 inch (89 mm) Waterous valve shall be installed.

VALVE CONTROL

The valve shall be controlled from the pump operator's panel location. The valve will be open when the handle is in line with all other closed valves.

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 swing-out valve with a stainless steel ball.

VALVE CONTROL

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

TRI-MAX™ *Space Frame Body* - ALUMINUM

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.

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.

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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 .125 inches (3.18 mm) to .250 inches (6.35 mm) throughout, dependent on the design requirement.

BODY MATERIAL TYPE

All body structural members shall be Aluminum 6061-T6 alloy material. All .125 inch (3.18 mm) sheet material shall be Aluminum Alloy 5052-H32 and .250 inch (6.35 mm) sheet materials shall be Aluminum Alloy 3003. These alloys are required because it provides optimum all-around performance for strength, manufacturing properties, and corrosion resistance.

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 COMARTMENT 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

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 aluminum 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

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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 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

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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.

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 926760 Red.

SPEEDLINER COMPARTMENT FINISH

The compartment interiors shall be coated with Speedliner.

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COMPARTMENT FINISH COLOR

The Speedliner Color shall be Medium Gray.

OVERLAYS

The entire front face of the apparatus body shall have aluminum diamond plate overlays installed. The entire rear face of the apparatus body shall have raw aluminum 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 overlay shall be integrated with a 1/8" aluminum diamond plate corner trim pieces 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 an 18 gauge mirrored 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.

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.

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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"

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 33.50 inches wide by 74.00 inches high with a lower depth of 25.50 inches and an upper depth of 12.50 inches.

The framed opening shall measure 31.00 inches wide by 70.00 inches 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 wide by 44.50 inches high with a depth of 12.50 inches. The lower 4.50 inches of the compartment shall be a depth of 25.50 inches.

The framed opening shall measure approximately 62.00 inches wide by 40.50 inches high.

Compartment "L3"

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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 wide by 74.00 inches high with an upper depth of 12.50 inches and the lower portion being transverse into the rear compartment, unless partitions are installed.

The framed opening shall measure approximately 46.50 inches wide by 70.00 inches high.

Compartment "R1"

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

The approximate interior dimensions of this compartment shall be a minimum of 33.50 inches wide by 74.00 inches high with a lower depth of 25.50 inches and an upper depth of 12.50 inches.

The framed opening shall measure approximately 31.00 inches wide by 70.00 inches high.

Compartment "R2"

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

The approximate interior dimensions of this compartment shall be a minimum of 62.00 inches wide by 44.50 inches high with a depth of 12.50 inches. The lower 4.50 inches of the compartment shall be a depth of 25.50 inches.

The framed opening shall measure approximately 62.00 inches wide by 40.50 inches 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 wide by 74.00 inches high with an upper depth of 25.50 inches and the lower portion being transverse into the rear compartment, unless partitions are installed.

The framed opening shall measure approximately 46.50 inches wide by 70.00 inches high.

DOOR CONSTRUCTION

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

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R.O.M ROLL-UP DOORS

R.O.M Corporation GEN IV 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 DOOR ALUMINUM SATIN FINISH

The side compartment roll up doors shall be satin aluminum 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.

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 45.50 inches wide and 34.00 inches 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 43.00 inches wide and 30.00 inches high.

REAR CENTER COMPARTMENT DUTCH DOOR

The compartment shall have a bi-folding removable Dutch Style door installed with interior access open to the rear side compartments for maximum storage availability.

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The door shall be horizontally hinged at the center location to allow the top panel to drop down for compartment access. The door assembly shall be pinned to the bottom frame of the rear compartment opening and can be easily removed for full access.

The upper door section shall be equipped with a D ring handle, the lower will be released by a paddle handle on the inside of the door.

REAR COMPARTMENT DOOR MATERIAL

The rear compartment doors shall be fabricated of 5052 smooth aluminum and shall be left a natural finish for application of the rear retro-reflective chevron striping.

REAR COMPARTMENT DOOR LINER MATERIAL

The rear compartment doors interior liners shall be fabricated of 5052 smooth aluminum and shall be dual-action sanded finish.

DOOR OPEN INDICATOR

Each flush door compartment shall have a magnetic style reed indicator switch. Each switch shall be hermetically sealed rated to 10,000,000 cycles. The reed shall be potted in the contact housing with polyurethane and the housings shall be molded fire retardant ABS plastic. The contact and magnetic housing shall snap-lock in the body material, one on the body and one in the 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.

RECESSED INTERMEDIATE REAR STEP

There will be an 8.00 inch recessed intermediate step above the rear center compartment designed into the rear body wall. This step will shorten the length of the hose bed by 8.00 inches and lower the door opening of the rear center compartment. The stepping surface shall be overlaid with embossed diamond plate, while the side shall be overlaid with standard diamond plate.

STEP LIGHTING

One (1) light shall be installed to illuminate the stepping areas as provided. The light shall be an OnScene Solutions "Access" Series 36.00 inch (914.40 mm) LED mounted to the underside of the hose bed extension step with P clamps.

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

LIGHTING ACTIVATION

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

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REAR COMPARTMENT PARTITIONS

The rear center compartment of the apparatus shall have permanent partitions installed on each side to increase utilization of the rear center area and to block access to either of the side compartments. The partitions shall be constructed of the same materials as used in the body structure and shall be welded in place to form permanent compartmentation.

SILL PLATES

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

ONSCENE COMPARTMENT STRIP LIGHTING

OnScene "Access" LED strip lighting shall be installed in the compartments as specified. Each light strip shall be of maximum length available to fit the opening.

The lighting in each compartment shall be on a separate circuit, and only illuminate when the compartment doors are open.

Two (2) full length "Access" LED strip lights shall be installed in two (2) over wheel compartment(s), one (1) each side of framed opening.

Two (2) full length "Access" LED strip lights shall be installed in four (4) full height compartment(s), one (1) each side of framed opening.

Two (2) full length "Access" LED strip lights shall be installed in the rear center compartment, one (1) each side of framed opening.

COMPARTMENT SHELF LIGHTING

Under each shelf specified, an OnScene "Access" LED strip light model shall be installed. The light shall be mounted toward the front edge of the shelf with additional wiring to allow for 8.00 inches of shelf adjustment. The light shall be of maximum length available to fit the width of the shelving specified.

Each light shall turn on when the respective compartment door is open.

UNDER SHELF LIGHTUNDER SHELF LIGHT LOCATION

One (1) light shall be installed under the one (1) shelf in the L-1 Compartment.

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

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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 .188 inch (4.78 mm) embossed aluminum diamond plate overlay.

The stepping area shall span the width of the apparatus, overlapping the perimeter of the structural tailboard framework. The embossed aluminum diamond plate material shall meet the latest NFPA minimum requirements for "slip resistance" on stepping, standing and walking areas.

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.

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.

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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.

LEFT FRONT WHEEL WELL COMPARTMENT

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

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.

RIGHT FRONT WHEEL WELL COMPARTMENT

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

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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.

FIRE EXTINGUISHER STORAGE COMPARTMENT

The compartment shall hold one (1) 2.5 gallon water extinguisher and one (1) 20 lb. ABC fire extinguisher.

SMART STORAGE DOORS

The smart storage compartment doors shall be .188 inch smooth aluminum and painted to match body job color. Where a module storage compartment is specified, a hinged door shall be provided. Each compartment door shall be secured with a push button latch.

DOOR OPEN INDICATOR

There shall be a "magnetic proximity" 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.

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.

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HOSEBED EXTENSION

A 5.00 inch deep hosebed extension shall be provided at the rear of the hosebed. The extension shall be constructed of .188 embossed diamond plate and shall be as wide as the hosebed.

HOSE BED AREA

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

HOSE BED AREA TRIMMED W/ MIRRORRED SST

The vertical corners along the back of the hose bed shall be trimmed with mirrored 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 mirrored 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.

SLIDING HOSE BED COVER

There shall be a single door hose bed cover furnished and installed.

The cover shall be full width of the hose bed and shall be on a slide rail assembly on each top rail and slide forward on the body into itself to a 'stop' point. At that point the cover can then be manually raised to an approximate 60 degree angle.

There shall be a gas shock on each side of the cover.

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

The hose bed cover 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.

An Igus Chainflex wire chain to be used for the wiring race way for the specified lighting.

There shall be a cover over the wiring on the back side of the arrow stick lights (WION lights)

Wait until final inspection to install any handrail device on top of the cover.

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REAR HOSE BED RESTRAINT

The dealer shall provide a means of restraining the hose at the rear of the hose bed to prevent inadvertent deployment of hose during transit.

LED HOSE BED COVER LIGHTING

Two (2) OnScene "Access" LED strip lights of equal length shall be mounted to the underside of the hose bed cover.

The lights shall be on a circuit and turning on only when the covers are opened.

The lighting is to be on the side edges of the rear/bottom section so when the cover is raised, it lights into the hose bed.

A third light shall be installed at the rear edge, side to side, of the hose bed cover.

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.

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

BAY 2:

-1000 feet of 5.00 inch hose

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BAY 3:

-600 feet of 2.50 inch hose double stacked.

TANK CAPACITY

The tank shall be 500 gallons (1893 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 polypropylene sheet stock which is a non-corrosive stress relieved thermoplastic. It shall be designed to be completely independent of the body and 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

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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) deep area.

The construction material shall utilize .50 inch (12.70 mm) polypropylene and be located in line with the tank suction valve. There shall be a 4.00 inch (100.00 mm) schedule 40 polypropylene 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.

LADDER STORAGE

The ground ladders shall be stored within a compartment located beside the booster tank.

All items shall be stored in their own independent section to allow one item to be removed without disturbing another. There shall be polypropylene slide angles installed in each section where applicable, to support the ladders and allow ease of removal. There shall be a stop in the front of each section to prevent the items from sliding forward.

There shall be a vertically hinged door, matching the rear overlay material, on the rear of the compartment with two (2) push button type latches and a chrome handle centered between the push button latches.

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.

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The top of the compartment will be raised 4" and have a stop at 70".

LADDER COMPARTMENT MATERIAL

The ground ladder compartment shall be fabricated of .125 inch smooth aluminum.

LADDER COMPARTMENT LOCATION

The ground ladder compartment shall be located on the left side of the water tank, with the ladders lying on their side.

LADDER COMPARTMENT OPEN END

The compartment shall be enclosed through the tank and open at the pumphouse end; where "stops" will be incorporated to prevent the ladders from sliding forward and damaging internal pumphouse components.

LADDER COMPLIMENT

The following ladders shall be supplied with the apparatus:

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 pike poles shall be supplied and installed by the Fire Department before the apparatus is placed into service.

STORAGE ABOVE LADDER COMPARTMENT

The inner side wall of the ladder compartment shall be extended vertically to the same height as the body side sheet to create a dunnage area above the ground ladder compartment. This storage area shall be open to the top and to the rear.

The sheet shall be overlaid with the matching material of the hose bed interior side sheets.

There shall be slotted hose bed flooring installed with approximately 1.00 inch clearance above the ladder box allowing for drainage.

EQUIPMENT DOOR STRIPING

Retro-Reflective striping in a chevron pattern matching the rear layout shall be provided on the equipment access door.

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RESCUE STORAGE COMPARTMENT

There shall be a rescue equipment storage compartment provided and installed with the apparatus. The compartment shall be constructed of .125 inch (3.18 mm) smooth aluminum.

All items shall be stored in their own independent section to allow one item to be removed without disturbing another. As required, there shall be a stop in the front of each section to prevent items from sliding forward.

The interior floor of the compartment shall be lined with black ABS plastic for ease of stowing and un-stowing equipment.

The compartment shall include provisions for mounting the following:

- One (1) Backboard with inside dimensions of 18.00 inches by 2.50 inches by 75.00 inches.
- One (1) Little Giant Ladder in the folded position.

SPECIALTY LADDER

The following ladder shall be supplied with the apparatus:

One (1) Little Giant model 17 type 1A 6005-T5 aluminum ladder with patented triple-locking hinges and a 300 pound capacity.

RESCUE COMPARTMENT LOCATION

The storage compartment shall be located in the hose bed storage area vertical on the right side.

The inboard wall shall be extended vertically to the top of the hose bed for additional storage above the rescue compartment.

SMOOTH ALUMINUM HINGED DOOR

The compartment shall have a hinged door to access equipment. The door shall be fabricated with .125 smooth aluminum and shall be secured with two (2) push button type latches and a 7.00 inch chrome handle centered between the latches.

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.

EQUIPMENT DOOR STRIPING

Retro-Reflective striping in a chevron pattern matching the rear layout shall be provided on the equipment access door.

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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 L2/L3 & R2/R3 over-wheel compartments flush to the forward and rearward frame openings. There will be 8" of adjustment for the shelves between the L1/L2 and R1/R2 compartment.

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 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.

UPPER SHELF DEPTH MODIFICATION

Any shelf specified to be installed in the upper body side compartments shall be reduced in depth by 1.00 inch (25.40 mm) for installation of wall mount tool boards.

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

LOWER FULL DEPTH SHELVING

A full width x full depth shelf shall be provided and installed in the lower area of the

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compartment as specified.

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

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

PERMANENT SHELVING

A permanent/fixed shelf shall be installed at the upper compartment break-line of each compartment specified.

The shelf shall be as wide and deep as possible and installed so the bottom of the shelf is flush with the lower compartment ceiling.

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

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

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/ONSCENE

The floor mounted tray shall be full width and shall be secured to an (OnScene) rollout slide system constructed of anodized aluminum extrusions and assembled using stainless steel fasteners (no welds).

The slide shall use a three extrusion rail design utilizing twelve to sixteen (12-16) urethane rollers. The roller shall contain two (2) precision roller bearings mounted in an aluminum hub with a molded on urethane cover. The slide shall have a cable operated, spring loaded latch complimented by a large hand opening and red pull handle (Pull to Release). The slide shall lock in the closed and full extension positions.

The tray shall have a 1000# capacity and 100% extension.

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

ROLL-OUT ASSEMBLY/AUSTIN

The floor mounted tray shall be full width and shall be secured to an Austin Hardware 22.00 inch (558.80 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 two (2) provided.

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

ROLL-OUT ASSEMBLY/ONSCENE

The adjustable tray shall be full width and shall be secured to an (OnScene) rollout slide system constructed of anodized aluminum extrusions and assembled using stainless steel fasteners (no welds).

The slide shall use a three extrusion rail design utilizing twelve to sixteen (12-16) urethane rollers. The roller shall contain two (2) precision roller bearings mounted in an aluminum hub with a molded on urethane cover. The slide shall have a cable operated, spring loaded latch complimented by a large hand opening and red pull handle (Pull to Release). The slide shall lock in the closed and full extension positions.

The tray shall have a 1000# capacity and 100% extension and adjustable height utilizing unistrut materials.

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

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

SHELF AND TRAY FINISH

Any shelf or roll-out tray installed shall have a dual-action sanded finish applied on the front and side faces.

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.

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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.

REAR RUB RAIL (ALUMINUM CHANNEL)

The rearward edge of the rear step shall be trimmed with brightly anodized aluminum channel rub rail.

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

The rub rail shall be secured with stainless steel fasteners and spaced away from the edge of the rear step with ½" nylon spacers, to help absorb moderate rear impacts and prevent the collection of water and debris for easier cleaning.

RUB RAIL RETRO-FLECTIVE STRIPING

One inch retro-reflective striping shall be applied to the length of each rub rail section making the perimeter of the apparatus more readily visible.

The reflective striping shall be "Ruby Red" in color.

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

Four (4) 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.

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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.

STEP LOCATION

One (1) folding step shall be installed on the right rear vertical face of the body.

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 rearward 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

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

STEP LOCATION

Four (4) 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

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

STEP LOCATION

One (1) folding step shall be installed on the left rear vertical face of the body.

One (1) 10" long x 1 1/4" diameter handrail constructed of extruded aluminum with a knurled

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grip, full length red reflective strip and full length illuminated white LED light strip shall be installed in a location above the rearward 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

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

KNURLED ALUMINUM HANDRAILS

All handrails shall match the chassis style.

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, current edition, 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 handrail shall be of an adequate length, as available usable space allows, to provide a suitable 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.

PUMP BOX ILLUMINATED HANDRAILS

There will be four (4) illuminated hand rails mounted to the pump house with two (2) on each side.

Two (2) mounted on top of the pump house at the outside edges that run the full length of the pump house.

Two (2) mounted on the light shields on each side of the pump house on the downward edges that run the full length of the light shield.

REAR TOW EYE

There shall be a rear tow eye installed on the left side frame rail. The location of the tow eye shall be below the rear center compartment.

The tow eye shall be manufactured of 1.00 inch plate steel that is bolted to the chassis frame rail with a minimum quantity of (6) grade 8 bolts. The plate shall be braced to the opposite frame rail to offset forces placed at an angle to the chassis frame. All steel components shall be painted black.

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LOW-VOLTAGE ELECTRICAL SYSTEM

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.**

VISTA SCREEN DISPLAYS

The customer shall provide details for the vista screen display layout at the pre-construction meeting.

NODE

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

Full depth body compartmentation designs shall have the node mounted to the rear frame wall that is perpendicular to the chassis frame rails.

Half depth compartmentation designs shall have the node mounted to the rear frame wall that is perpendicular to the chassis frame rails.

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 with an inspection hole positioned for view of the node indicator LED lights. The finish of the cover shall match the compartments interior finish. Node covers will not include any type of shelf mounting structure and shall limit the height of unistrut or shelf height within the compartments.

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PERIMETER LIGHTS LOCATION

There shall be six (6) 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 walkway, one (1) under each side at the front of the body, and two (2) under the rear tailboard.

LED PERIMETER LIGHTS

The underbody perimeter lights provided will be Truck-Lite 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 B&D-FORWARD:

There shall be two (2) Whelen WION series LED lights with chrome bezels provided and installed with the apparatus.

There shall be one (1) each side of the body in the upper forward corners.

SIDE WARNING LIGHTS FLASH

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

SIDE WARNING LIGHTS COLOR

The upper warning lights mounted on the side positions shall be blue with clear lenses.

UPPER ZONE B&D-REAR:

There shall be two (2) Whelen WION series LED lights with chrome bezels provided and installed with the apparatus.

There shall be one (1) each side of the body in the upper rear corners.

SIDE WARNING LIGHTS FLASH

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

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SIDE WARNING LIGHTS COLOR

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

UPPER ZONE C:

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

The beacons shall be B63 Series with R316 Super-LED beacons with red lights and clear lenses and two (2) M7 series LED amber flashing lights with clear lenses surface mounted below the beacons.

The upper ZONE C specified lights shall be mounted directly to the horizontal body surface as far rearward as possible.

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 M6 series LED lights with chrome bezels, two (2) each side, provided and installed with the apparatus.

SIDE 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. The warning lights shall be set to emit the "DoubleFlash 150" in/out flash pattern.

SIDE WARNING LIGHTS COLOR

The lower side warning lights mounted on the side positions shall be split red/amber with a clear lens.

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.

AUXILIARY WARNING LIGHTS LOWER ZONE B&D

There shall be four (4) auxiliary Whelen WION series LED lights installed two (2) each side.

One (1) shall be installed in front and one (1) behind the rear axle on the lower body sides. These four (4) lights shall be installed in the rear fender (wheel well) area of the body.

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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 shall be red at the front side location and blue at the rear location with clear lenses.

LOWER ZONES B&D CAST ALUMINUM LIGHT HOUSING WITH PAINTED INSERT

A cast aluminum light housing with painted outward facing inserts, shall be installed for the rearmost warning light in zones B&D. The housing will ensure the light is mounted as far rearward as possible.

The inserts shall be painted to color match the body.

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 M9 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 rear lights shall feature multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors. The warning lights shall be set to emit the "DoubleFlash 150" in/out flash pattern.

REAR WARNING LIGHTS COLOR

The lower rear warning lights mounted at the rear shall be split red/amber with a clear lens.

REAR WARNING SWITCH

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

LED REAR TAIL LIGHT ASSEMBLY

There shall be Whelen M9-Series Super 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) #M9BTT LED red brake light

One (1) #M9T LED series amber turn signal light

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One (1) #M9 BUW LED clear backup light

MOUNTING FLANGES

There shall be individual mounting flanges provided for each light of the tail light assembly.

BACKUP LIGHTS

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

LED DOT LIGHTING

There shall be a total of eleven (11) red clearance lights and two (2) amber clearance lights installed on the apparatus.

There shall be seven (7) red clearance 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. The two additional (2) lights shall be located as high and wide as possible.

On the sides of the apparatus there shall be four (4) red clearance lights, two (2) located on each side of the apparatus in the lower body at the front and rear portion of the rear side compartments. Additionally, the sides of the apparatus shall have two (2) amber clearance lights installed, one (1) located on each side of the apparatus in the lower body at the rear portion of front compartments.

The lights shall be Weldon brand 9186-1500 series LED red and amber 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 steady burn when not blinking.

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.

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

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plate.

The lights shall be controlled by a Whelen TACTLD1 control head.

RDL CONTROL HEAD MOUNTING LOCATION

Rear Directional Lightbar control head shall be recess mounted in the center rocker panel at the lower left location.

REAR VIEW CAMERA LOCATION

A camera shipped loose with the chassis shall be mounted at the center location on the rear of the apparatus body under the hose bed extension for maximum viewing capability.

ACCESSORY POWER LOCATION

In the EMS cabinet, on the left side wall (EMS is dealer provide and install, Manufacture to coil the power behind the driver seat with extra length for placement by dealer), 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.

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

Whelen model #M9LZC LED gradient scene lighting shall be surface mounted on the apparatus with a chrome bezel.

Each light shall offer LED directional lighting from 2 to 40-degrees with internal and external optics.

REAR SCENE LIGHT ACTIVATION

The rear scene lighting shall be activated when the apparatus transmission is shifted into reverse and by a rocker switch located on the switch panel in the cab.

The switch shall be labeled as follows:

Rear Scene

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HARRISON HYDRAULIC 6,000 WATT GENERATOR

The generator shall be one (1) Harrison Falcon MAS Hydraulic Driven Generator rated at 6,000 watts, 50/25 amps, 120/240VAC, 60Hz, 1-phase.

UL TESTING 110/220-VOLT & GENERATOR

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

HARRISON HYDRAULICALLY DRIVEN GENERATOR (MAS FALCON)

The generator shall be designed and assembled by a company with no less than 20 years experience in the manufacture of hydraulic driven generators. The generator components shall be housed in a structural steel frame, which affords protection to the components and provides a unitized mounting module.

The generator shall have top access to the oil filter, oil fill tube and electrical interface box. The hydraulic oil reservoir shall include an oil level sight gauge visible from three sides; an oil temperature gauge; an oil fill cap; an oil filter and an internal venturi boost unit to provide positive pressure to the pump suction port.

The hydraulic oil reservoir shall be shipped attached to the structural steel frame. The hydraulic oil reservoir shall have an option to be remote mounted if required. The generator shall have a cover consisting of NFPA approved diamond plate. A meter package that provides the frequency, voltage and amperage of each leg shall be provided.

The generator shall not utilize electronic controls or a multiplex system to control the frequency. The generator shall include a bypass solenoid to remotely turn the generator on/off with a 12 VDC signal. The generator shall be a commercial type with a heavy-duty bearing and of brushless design to ensure low maintenance. No brushes or slip rings shall be allowed.

The generator and motor shall be close coupled and aligned using a Morse taper with a through bolt to secure the motor to the generator. No two (2) bearing generators shall be permitted. The system shall be capable of producing the full nameplate power when driven from the vehicle PTO from idle to maximum engine speed. The generator shall be able to be used while vehicle is either stationary or in motion. The generator shall provide an option for a self-sealing air intake to prevent re circulation of exhaust air.

The generator shall provide an option for a vertical exhaust fan in addition to the air intake fan. Single fan systems shall not be allowed.

The generator shall provide a dedicated air intake duct for the alternator and a dedicated air intake duct for the heat exchanger. Both air intake ducts shall be located on the same side of the generator. The hydraulic motor and pump shall be of axial piston design to provide low internal leakage and a high degree of frequency stability. Gear motors shall not be allowed. The hydraulic pump shall match the system with the proper orifice, pressure compensator, and load sense settings to provide stable output regardless of engine rpm or electrical load demands. Use of electronics to control the flow shall not be allowed.

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The system shall be capable of normal operations using a commonly available premium hydraulic oil; Mobile DTE series or equivalent. All fluid service points shall be in close proximity to the reservoir for ease of scheduled maintenance.

When properly installed, the system shall be warranted for a period of not less than six (6) years or 1000 hours, whichever should come first.

The generator shall be tested at the full nameplate rated load prior to shipping and the test report shall be included. The test report will document the generator's performance at various loads from no load to full load to ensure reliable power delivery at those loads.

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 through the multiplexing vista display.

GENERATOR DISPLAY

A FROG (Frequency Regulation of Generator) generator display kit shall be installed to monitor a 60 Hz, generator.

The kit shall include:

- (1) Display module.
- (1) Voltage transformer.
- (2) Current transformers and cables.

The display module shall consolidate five (5) generator monitoring instruments into one device. The display case shall be waterproof and have dimensions not to exceed 4.25 inches high by 4.25 inches wide by 3.25 inches deep.

The following continuous displays shall be provided with super bright LED digits more than .50 inches high:

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- Generator frequency in hertz
- Line 1 current in ampere
- Line 2 current in amperes
- Generator voltage in volts

The program shall support the accumulation of elapsed generator hours and the monitoring of hydraulic oil temperature. Generator hours and oil temperature shall be displayed at the push of a button. Audible warning alarm outputs are provided for generator overload, over/under voltage fluctuations, and high oil temperature.

GENERATOR DISPLAY LOCATION

The display shall be installed on the pump operator's gauge panel.

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 LOCATION

The load center shall be recessed and mounted to the upper portion of the forward wall in the R-1 compartment and shall be located as "best fit" to avoid interference and maintain functionality. Any exposed wiring shall be contained within conduit to ensure safety. The cutout shall be trimmed with trim-lock for a pleasing appearance.

SIDE SCENE LIGHT LOCATION

There shall be two (2) scene lights installed on top of the apparatus catwalks, one (1) each side, at the front body corners.

SCENE LIGHT MODEL

Whelen Pioneer model #PFP2AP pedestal mounted scene light shall be provided on the apparatus.

The 150 watt, 120v AC Pioneer lighthead shall measure 4.125 inches high by 14.00 inches wide by 2.50 inches deep. The lighthead shall have 15,000 usable lumens and have an amp draw of 1.2 amps.

There shall be a twist lock receptacle with a weather resistant cover provided adjacent to the tripod mounting location in vehicle in the hose bed wall.

QUICK RELEASE MOUNTING KIT

There shall be a quick release mounting kit provided with the above stated pedestal light.

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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

CORD REEL

One (1) Hannay model #CR series cord reel shall be installed on the apparatus as specified.

ELECTRICAL CORD

The reel shall come equipped with 175 feet of yellow 10-3 electrical cord. There shall be a cord stop supplied with the reel specified.

DISTRIBUTION BOX

The cord shall be hardwired to a Circle D remote power distribution box with two (2) NEMA L5-15 single receptacles and two (2) NEMA 5-15 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 L5-15 R

Position 2: NEMA L5-15 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 pump compartment in the upper rearward portion of the pump house on the right side behind a horizontally hinged door made of same material as the pump house overlays.

The door shall be secured with two (2) push button latches and up to two (2) gas shocks. A chrome suitcase handle shall be provided centered between the latches.

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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.

The door shall be labeled "CORD REEL".

ROLLER ASSEMBLY

There shall be a four (4) way roller assembly provided and mounted behind the hinged door to guide the cord on and off the spool to prevent chafing on the pump panels.

CORD REEL

One (1) Hannay model #CR series cord reel shall be installed on the apparatus as specified.

ELECTRICAL CORD

The reel shall come equipped with 175 feet of yellow 10-3 electrical cord. There shall be a cord stop supplied with the reel specified.

DISTRIBUTION BOX

The cord shall be hardwired to a Circle D remote power distribution box with two (2) NEMA L5-15 single receptacles and two (2) NEMA 5-15 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 L5-15 R
Position 2: NEMA L5-15 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 pump compartment in the upper rearward portion of the pump house on the left side behind a horizontally hinged door made of same material as the pump house overlays.

The door shall be secured with two (2) push button latches and up to two (2) gas shocks. A chrome suitcase handle shall be provided centered between the latches.

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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.

The door shall be labeled "CORD REEL".

ROLLER ASSEMBLY

There shall be a four (4) way roller assembly provided and mounted behind the hinged door to guide the cord on and off the spool to prevent chafing on the pump panels.

DEALER SUPPLIED/INSTALLED LIGHT TOWER

An SVI KL-450 light tower shall be supplied and installed by the Dealership prior to the truck being placed into service.

INSTALLATION PROVISIONS

The light tower shall be installed on the top of the pumphouse. There shall be formed structural "C" channels installed and welded to the top surface of the pump house in appropriate locations that match the light tower mounting plate bolt pattern. There shall be 2.50 inch tubes welded along each inside edge of the channel for additional reinforcement.

There shall be electrical provisions provided for the future installation of a light tower at the top of the pumphouse.

The provisions shall include one (1) appropriately sized circuit breaker installed in the load center with 240V 4 wire cable ran to the top of pumphouse area. There will be ten (10) feet of wire cable coiled, capped and secured at a location to be determined during the pre construction based on layout of components.

The 12 V wiring for the control cable shall be run from the same location of the 240 V wiring in the pumphouse to the forward wall of the front driver side compartment with three (3) feet of wire cable coiled, capped and secured approximately 52.00 inches from the floor and 10.00 inches from the door jam.

There shall also be 12 V open door circuit wiring terminating in the L1 compartment at the same location as the control cable.

The light tower shall be installed in the nested position with the light tree orientated towards the officer's side of the apparatus.

REFLECTIVE STRIPING

The reflective striping shall be supplied and installed by the Dealer.

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,

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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.

RETRO-REFLECTIVE STRIPING-SEVERE DUTY STEEL FRONT BUMPER

The vertical surfaces of the steel front bumper shall be equipped with Diamond Grade, retro-reflective striping in a chevron pattern, sloping downward and away from the centerline of the bumper at an angle of 45-degrees. The stripe shall be 6.00 inch (152.40 mm) wide alternating in colors.

CHEVERON 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.

DEALER SUPPLIED DECALS

The apparatus decals shall be provided and installed by the Dealership prior to the apparatus being placed into service.

LICENSE PLATE MOUNTING

A Cast Products, model LP0004-1-B, cast aluminum fully enclosed license plate bracket shall be installed. The bracket shall incorporate a clear LED light (WL0501) to illuminate the license plate and meet DOT requirements.

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, one (1) under the body in front of the rear wheels on the left side and one (1) behind the rear wheels on the left side.

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DELAER SUPPLIED EQUIPMENT

EMS COMPARTMENT

There will be a custom EMS Compartment provided and installed behind the driver on the apparatus. The compartment will have two (2) shelves, ELD strip lighting and a cargo netting closure.

LISTA TOOL BOX

There will be a lista tool box provided and installed on the apparatus.

PACK TRAC

There will be a performance advantage mounting system provided and installed in five compartments and the back of the engine tunnel on the apparatus.

HOSE RESTRAINTS

There will be a custom hose restraints provided and installed on the apparatus for the crosslays/speedlays and hose bed.

TFT HURRICANE RC DECK GUN

There will be a TFT Hurricane RC deck gun with wireless remote control and 18" extend-a-gun provided and installed on the apparatus.

CUSTOM ALUMINUM TOOL MOUNT

There will be a custom aluminum rescue tool mount provided and installed on the apparatus..

CUSTOM SAW TRAY

There will be a custom aluminum saw tray provided and installed on the apparatus..

LED HEADLIGHTS

There will be four (4) LED headlights provided and installed on the apparatus.

SUPERVAC KNIGHT LIGHT II TELESCOPING LIGHT

There will be a SVI Knight Light II KL-450 telescoping light provided and installed on the apparatus.

MOUNTING OF DEALER SUPPLIED EQUIPMENT

All equipment provided by the dealer will be installed.

Spartan

LEAGUE CITY FIRE DEPARTMENT

MOUNTING OF CUSTOMER SUPPLIED RADIOS AND MDC

All radios and MDC provided by the customer will be installed by the dealer.

DEALER SUPPLIED EQUIPMENT

Item Number	Description	Ordered	U/M
MET-HYDRANT/SPANNER SET	ONE ADJUSTABLE HYDRANT WRENCH	2	EA
PAC-1004-PT	HANDLELOK STRAP MOUNT	6	EA
PM-IGLOO WATER COOLER PROV	PROVISION FOR IGLOO WATER	1	EA
ZIA-UH-6-30-3-SFPHS	SCBA WALKAWAY BRACKET	1	EA
TPC-1212	TURTLE TILE 12" X 12" BLACK	50	EA
TPC-AF	FEMALE RAMP EDGE	10	EA