METRO FIRE
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L221143 Spartan Stock 110' NXT RM Quint 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 (NFPA) 1901, Standard for Automotive Fire Apparatus, 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 and aerial device 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 and aerial structures specified in the bidders manufacturing facilities.

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

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

The bid shall be accompanied by a set of "Contractor's Specifications" consisting of a detailed

description of the apparatus being furnished under this contract which conform. Computer runoff sheets are not acceptable as “Contractor’s Specifications”. Item compliance shall be indicated in the “Yes/No” column of each item by all Bidders. Note: Each bidder shall submit their bid in the same sequence as these specifications to allow the department to easily compare. {No Exceptions}

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

QUALITY AND WORKMANSHIP

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

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

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

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

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

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

DELIVERY

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

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

PERFORMANCE TESTS AND REQUIREMENTS

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

A. The apparatus shall be capable of accelerating to 35 MPH (55 km/hr.) from a standing start within 25 seconds on a level concrete highway without exceeding the maximum governed RPM of the engine.

B. The apparatus, fully loaded, shall be capable of obtaining a minimum top speed of 50 MPH (80 km/hr.) on a level dry concrete highway with the engine not exceeding its governed RPM (fully loaded).

C. The service brakes shall be capable of stopping a fully loaded vehicle in 35ft (10.7 m) at 20 mph (32.2 km/hr.) on a level concrete highway. The air brake system shall conform to Federal Motor Vehicle Safety Standards (FMVSS) 121.

D. The apparatus, when fully loaded, shall have not less than 25 percent or more than 50 percent of the weight on the front axle, and not less than 50 percent nor more than 75 percent on the rear axle.

E. The contractor shall have the Underwriter's Laboratories, LLC conduct the tests of the apparatus as in accordance with standard practices required by the Underwriter Laboratories, LLC (Guide for the Certification of Fire Department Pumper latest edition). A copy of all tests shall accompany the Apparatus. (For apparatus sold within Canadian ULC S515 latest revision shall prevail).

F. The contractor shall furnish copies of the Manufacturer's record 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 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.

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, aerial device fluid,

generator fluid (if applicable), pump primer fluid (if used) and drive axle lubrication fluid and any other fluids not mentioned.

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

When equipped with a fire pump, 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 (NFPA) 1901, Standard for Automotive Fire Apparatus, 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 of 2,500 lbs. per NFPA 1901, Standard for Automotive Fire Apparatus criteria It shall be the responsibility of the purchaser to provide the contractor with the weight of any additional equipment and personnel to be carried and the location on the apparatus 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.

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, Aerial or Pump (if applicable), 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.

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

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 prior to manufacturing for fire department approval.

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 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.

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.

The following manuals pertaining to the aerial device shall also be included:

- Two (2): Operators' manuals.
- Two (2): Parts manuals in a CD format.
- Two (2): Electrical and Hydraulic Diagrams in a CD format.

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 upkeep of the general apparatus.

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

- Owner name and address
- Apparatus manufacturer, model, and serial number
- Chassis make, model, and serial number
- GAWR of front and rear axles
- Front tire size and total rated capacity in pounds
- Rear tire size and total rated capacity in pounds
- Chassis weight distribution in kilograms with water (if applicable) and manufacturer mounted equipment (front and rear)
- Engine make, model, serial number, rated horsepower, related speed and no load governed speed
- Type of fuel and fuel tank capacity
- Electrical system voltage and alternator output in amps
- Battery make and model, capacity in CCA
- Paint numbers
- Weight documents from a certified scale showing actual loading on the front axle, rear axle(s), and overall vehicle (with the water tank full (if applicable) but without personnel, equipment, and hose)
- Written load analysis and results of the electrical system performance tests

- Transmission make, model, and type
- Pump to drive through the transmission (yes or no)
- Engine to pump gear ratio and transmission gear ratio used
- Pump make and model, rated capacity in gallons per minute, serial number, and number of stages
- Pump manufacturer's certification of suction capability
- Pump manufacturer's certification of hydrostatic test
- Pump manufacturer's certification of inspection and test for the fire pump
- Copy of the apparatus manufacturer's approval for stationary pumping applications
- Pump transmission make, model and serial number
- Priming device type
- Type of pump pressure control system
- The engine manufacturer's certified brake horsepower curve for the engine furnished, showing the maximum no load governed speed
- Certification of water tank capacity
- The certification of inspection and test for the aerial device
- All the technical information required for inspections to comply with (NFPA) 1911, Standard for Automotive Fire Apparatus and Standard for Testing Fire Department Aerial Devices.

ELECTRICAL SCHEMATICS

The apparatus manufacturer shall supply one (1) set(s) of "Generic" wiring schematics with each apparatus.

WARNING AND INFORMATION LABELS

All warning and informational labels (non-vendor specific) shall be provided in compliance with (NFPA) 1901, Standard for Automotive Fire Apparatus, and installed in the appropriate locations to alert the operator of potential hazards and operating instructions.

ON-LINE CUSTOMER INTERACTION

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

- 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.

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 to be free from defects, under normal use and service, for a period of seven (7) years from the date placed into service.

PLUMBING WARRANTY

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

TANK WARRANTY

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

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.

WARRANTY - AERIAL DEVICE

The aerial device manufacturer shall guarantee to the original purchaser to repair or replace any

defective structural component resulting from faulty material or workmanship for a period of twenty (20) years after delivery of the aerial device to the purchaser. The warranty shall cover the aerial device weldments, open base, torque box and outrigger weldments.

To ensure sole source responsibility of the aerial device, the bidder shall clearly state its intention to warrant the aerial device, open base, torque box and outrigger weldments as these integral parts and components of the aerial device.

WARRANTY - TELESCOPIC WATERWAY ASSEMBLY

The manufacturer of the aerial device shall guarantee to the purchaser to repair or replace any defective or prematurely failed Telescopic Waterway Assembly, resulting from structural defects or failures, for a period of ten (10) years after delivery of the aerial device to the purchaser.

APPARATUS TEST BY UNDERWRITERS LABORATORIES, LLC

The following Apparatus shall comply with all (NFPA) 1901, Standard for Automotive Fire Apparatus, applicable regulations in effect as of the contract signing date. There shall be multiple tests performed by the contractor and Underwriter's Laboratories, LLC 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, LLC 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.

AERIAL TESTING & CERTIFICATION

General

The following Apparatus shall comply with all (NFPA) 1901, Standard for Automotive Fire Apparatus, applicable regulations in effect as of the contract signing date. There shall be multiple tests performed by the contractor and Underwriter's Laboratories, LLC when the apparatus has been completed. The manufacturer shall furnish the completed Test Certificate(s) to the purchaser at time of delivery.

The apparatus upon completion will be tested and certified by Underwriters Laboratories, LLC. The certification tests will follow the guidelines outlined in (NFPA) 1901, Standard for Automotive Fire Apparatus, "Standard for Fire Apparatus".

There shall be multiple tests performed by the contractor and Underwriter's Laboratories, LLC when the apparatus has been completed. The manufacturer shall provide the completed Test Certificate(s) to the purchaser at time of delivery. The inspection services of Underwriters Laboratories, LLC are available to all bidders on an equal basis; therefore, no third party testing service shall be acceptable.

Performance Testing

All work outlined in (NFPA) 1901, Standard for Automotive Fire Apparatus, including nondestructive testing, shall be conducted at the manufacturer's facility. In addition, the following test work, Certification Test sections of (NFPA) 1901, Standard for Automotive Fire Apparatus, shall be conducted.

1. 1-1/2:1 DYNAMIC STABILITY AND LIFT TEST - A test of the apparatus shall be performed that the aerial device sections are so designed and powered to support a load representing 150% of the manufacturer's rated tip load capacity at maximum horizontal reach on level ground. Since this is a dynamic test, the load must be raised, lowered and rotated without evidence of instability.

2. 1-1/3:1 DYNAMIC STABILITY AND LIFT TEST - A test of the apparatus shall be performed that the tip and aerial device sections are so designed and powered to support a load representing 133% of the manufacturer's rated tip load capacity at maximum horizontal reach on a five (5) degree slope. Since this is a dynamic test, the load must be raised, lowered and rotated without evidence of instability.

3. TIME TEST - A test of the apparatus shall be performed to raise the aerial device from a bedded position extended to full height and rotated through a 90 degree turn smoothly and without undue vibration in not over 120 seconds.

4. WATER TOWER TEST #1 - A test of the apparatus shall be performed to test its ability to discharge 1000 gallons per minute parallel to the aerial device with the unit at full extension and zero degree elevation. The unit shall be capable of performing this test while loaded to its rated tip load capacity.

5. WATER TOWER TEST #2 - A test of the apparatus shall be performed to test the ability to discharge 1000 gallons per minute, 90 to the aerial device while at full extension, zero degree elevation. The unit shall be capable of performing this test while loaded to its rated tip load capacity.

Bidders must state their ability to comply with all of the above tests. Failure to do so shall be grounds for rejection of their bid.

Written Examination and Test Report

A complete written Examination and Test Report for each aerial device inspection performed at the manufacturer's facility. The test report, as required by (NFPA) 1901, Standard for Automotive Fire Apparatus, shall include the following test results.

a). Torque verification of all mounting bolts including bolt size, grade, and torque specification.

b). The following NDT methods and results shall be recorded. All ferrous welds shall be magnetic particle inspected for defects. All nonferrous welds shall be visually inspected, and if questionable defects are identified, a penetrating dye shall be used to further evaluate the quality of the weld. All bolts and pins shall be ultrasonically inspected for internal flaws. A waterway pressure test shall be performed, and a hydraulic oil sample taken.

c). The following measurements shall be taken and recorded in the examination and test record: bearing clearance and backlash, elevation cylinder drift, engine speed operating rpm, relief

pressure, stabilizer extension cylinder drift, aerial device section twist, hardness readings, base rail thickness, winch drift, extension brake drift, and extension cylinder drift.

Personnel

The inspectors performing the test work on the units are certified to Level II in the required NDT methods, under the requirements outlined in ASNT document CP-189.

Aerial Apparatus Certification
When the unit successfully meets all the requirements outlined in (NFPA) 1901, Standard for Automotive Fire Apparatus, UL, LLC shall issue a Certificate of Automotive Fire Apparatus Examination and Test stating the unit's compliance with (NFPA) 1901, Standard for Automotive Fire Apparatus.

FACTORY PRE-CONSTRUCTION CONFERENCE

The factory authorized Distributor shall be required, prior to manufacturing, to have a pre-construction conference at the manufacturing facility with a factory representative present and with One (1) individual from the Spartan ER to finalize all construction details.

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

FINAL INSPECTION CONFERENCE

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

AERIAL LADDER DEVICE DEMONSTRATION - (3) CONSECUTIVE DAYS

A factory trained and authorized instructor shall provide three (3) consecutive days of on-site classes after apparatus acceptance. Topics covered in the class shall include:

- General familiarization and demonstration of aerial device
- Aerial apparatus safety including a review of all safety devices, interlocks, and operational hazards
- Positioning and locating the vehicle for safe operations
- Chassis parking brakes and engagement of hydraulic system
- Deployment of stabilization devices and use of ground pads
- Operation of elevation, extension, and rotation of the aerial device

- Operation of waterway, nozzle, and other firefighting devices of aerial device
- Operation and use of breathing air system
- Specific aerial device maintenance and service areas for operators
- Shutdown and return to service operations
- Operation of tip controls and platform controls if equipped

Classes shall consist of presentations as well as hands-on demonstration.

PUMP & APPARATUS FAMILIARIZATION

The familiarization course shall cover the operation and preventative maintenance of all components of the apparatus called for in the specifications, specifically 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 familiarization is organized in such a manner that both the mechanics and fire personnel receive the full benefit of the structured training. The firefighter/operator familiarization shall be conducted within one week after the vehicle is fully accepted and readied for service by the "Purchaser" or at a time mutually agreed upon by the "Purchaser" and "Supplier".

MAXIMUM OVERALL LENGTH REQUIREMENT

The apparatus specified shall be constructed as detailed and shall NOT exceed a maximum overall length of 40' 0".

MAXIMUM OVERALL HEIGHT REQUIREMENT

The apparatus specified shall be constructed as detailed and shall NOT exceed a maximum overall height of 11' 7".

MAXIMUM OVERALL WIDTH

The apparatus specified shall be constructed as detailed and shall NOT exceed a Maximum Overall Width of One Hundred (100") inches.

This dimension shall include the primary construction of the apparatus body and chassis cab. Any peripheral items shall not be incorporated into this measurement.

The items included, but not limited to, are: Rub Rails, Fenderettes, Mirrors, Lights, Handrails, Front Bumpers, Cab Steps, Overlays, Etc.

MAXIMUM WHEELBASE REQUIREMENT

The apparatus specified shall be constructed as detailed and shall NOT exceed a maximum

wheelbase of 224.5 inches.

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

MODEL

The chassis shall be a Gladiator 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 2023 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. The chassis manufacturer is not responsible for compliance to state, regional, or local regulations. Dealers should identify those regulations and order any necessary optional equipment from the chassis manufacturer, 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. All applicable caution, warning, and safety notice labels shall be Innovative Controls brand. Where applicable to the location within the specific layout and label package of the cab and chassis, the labels shall include decorative chrome bezels. Designs shall include bezels that fit individual labels or packaged configurations of labels in certain common locations.

The following labels shall be Innovative Controls brand, each including a decorative chrome bezel (where applicable):

- Shoreline

- Aerial Stowed
- Aerial Breakers 2
- Air Conditioner
- Cab Tilt Plate
- Air Compressor Breaker
- Battery Conditioner Breaker
- Helmet Caution
- Horn Tag
- Q2B Tag
- Load Center Plate
- Not a Step Label
- Occupancy Tag
- Do Not Move
- Occupants Must Be Seated
- Do Not Stand
- Danger Do Not Weld
- Danger--Untrained Operator
- DEF Fill Access (Including Additional 2907 Optional Labels)
- Battery Direct
- Kneeling
- IFS Air Fault
- Engine Brake
- Retarder
- LR 100 Amp Node
- 300 Amp EPU
- 100 Amp Front O/R Node
- 100 Amp T/T Node
- 100 Amp RR O/R Node
- 10 Amp EPU
- Master Power

- 12 Volt Power
- Aerial Hours
- Pump In Drive
- Windshield Washer Fluid

APPARATUS TYPE

The apparatus shall be a Quint vehicle designed for emergency service use. The apparatus shall include a permanently mounted fire pump which has a minimum rated capacity of 750 gallons per minute (3000 L/min), a water tank, a hose storage area, a compliment of ground ladders, and an aerial ladder or elevating platform with a permanently mounted waterway that shall be rear mounted thus providing the following vehicle benefits:

- Improved mobility vs. mid-ship mounted units, due to shorter overall travel length and wheelbase.

- Increased compartment space, hose load, and water capacity in the body, resulting from ladder being raised to clear the cab.

- Shorter vehicle wheelbase.

- Shorter overall length of vehicle.

REAR MOUNT AERIAL DEVICE TYPE

Chassis provisions shall be provided for a 110.00 feet high vertical reach rear mount ladder to the integration parameters of Ladder Tower Company.

AERIAL HYDRAULIC GENERATOR

Chassis shall include aerial provisions for a chassis PTO driven hydraulic pump piggy-backed for aerial device hydraulics and 120VAC hydraulic generator.

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.

VEHICLE ANGLE OF APPROACH PACKAGE

The angle of approach of the apparatus shall be a minimum of 8.00 degrees.

NFPA1901 Angle of Approach definition:
"To determine the angle of approach, place a thin steel strip against the front of the tires where they touch the ground or stretch a tight string from one front tire to the other at the front where they touch the ground. Determine the lowest point (component or equipment) on the vehicle forward of the front tire that would make the smallest angle of approach. Hang a plumb bob from the lowest point and mark the point on the ground where the point of the plumb bob touches. Measure the vertical distance from the ground to the point where the plumb bob was hung (distance *V*). Measure the horizontal distance from the plumb bob point to the steel strip or string running from front tire to front tire (distance *H*). Divide the vertical distance by the horizontal distance. The ratio of *V/H* is the tangent of the angle of approach. If the ratio is known, the angle of approach can be determined from a table of trigonometric functions of angles or from a math calculator. The standard requires a minimum angle of approach of 8.00 degrees: since the tangent of 8.00 degrees is 0.1405, if *V* divided by *H* is 0.1405 or larger, the angle of approach is 8.00 degrees or greater."

AXLE CONFIGURATION

The chassis shall feature a 6 x 4 axle configuration consisting of a tandem rear drive axle set with a single front steer axle.

GROSS AXLE WEIGHT RATINGS FRONT

The front gross axle weight rating (GAWR) of the chassis shall be 23,000 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 54,000 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. Chassis driveline pump provisions shall include an interlock feature for automatic setting of the park brake when the vehicle is shifted into pump mode while the transmission is in neutral, and the transmission output speed translates to less than 1 mph. When the conditions are met the driver side parking brake valve shall activate. Once shifted to road mode the condition for electric automatic brake engagement is no longer present and the driver's parking brake control valve shall function normally.

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

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

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

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

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

The exterior width of the cab shall be 99.40 inches wide with a minimum interior width of 91.00 inches. The overall cab length shall be 131.10 inches with 54.00 inches from the centerline of the front of the axle to the back of the cab.

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

The cab shall offer an interior height of 57.50 inches from the front floor to the headliner in the non-raised roof area and a rear floor to headliner height of 55.00 inches at a minimum. The cab shall offer an interior measurement at the floor level from the rear of the engine tunnel to the rear wall of the cab of 49.88 inches. All interior measurements shall include the area within the interior trimmed surfaces and not to any unfinished surface.

The cab shall include a driver and officer area with two (2) cab doors large enough for personnel in full firefighting gear. The front doors shall offer a clear opening of 40.25 inches wide X 53.50 inches high, from the cab floor to the top of the door opening. The cab shall also include a crew area with up to two (2) cab doors, also large enough for personnel in full firefighting gear. The rear doors shall offer a clear opening of 32.25 inches wide X 51.00 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.

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 cab fascia shall include a classic box style, 304 stainless steel front grille. The grille shall measure 55.45 wide X 33.50 inches high X 1.50 inches deep. The upper portion of the grille shall be hinged to provide service access behind the grille. The grille shall include a minimum free air intake of 750.00 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 Sikkens paint.

CAB PAINT PRIMARY/LOWER COLOR

The lower paint color shall be Sikkens FLNA 32525 Red.

CAB PAINT SECONDARY/UPPER COLOR

The secondary/upper paint color shall be Sikkens FLNA 96920 Metallic Gray.

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

Purchaser shall receive a Paint and Finish (Exterior Clear coated) Ten (10) Years limited warranty in accordance with, and subject to, warranty certificate RFW0710.

The warranty certificate is incorporated by reference into this proposal and included with this proposal or available upon request.

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 full length in design to fully enclose the lower cab steps. Entry doors shall include Pollak mechanical plunger style switches for electrical component activation.

CAB INSULATION

The cab ceiling and walls shall include a nonwoven polyester fiber insulation. The insulation shall act as a barrier absorbing noise as well as assisting in sustaining the desired climate within the cab interior.

REAR CAB ROOF MODIFICATION

The cab shall include a rear wall extension. The cab extension shall extend 13.50 inches out from the back wall of the cab.

The cab extension shall measure 47.25 inches down from the raised cab roof. The lower interior flat surface of the entire cab extension shall be 12.00 inches above the cab floor.

The rear wall extension weight limit shall be 1500 pounds.

CAB STRUCTURAL WARRANTY

Purchaser shall receive a Cab Structure (Aluminum) Ten (10) Years or 100,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0602. The warranty certificate is incorporated by reference into this proposal and included with this proposal or available upon request.

CAB TEST INFORMATION

The cab shall have successfully completed the preload side impact, static roof load application and frontal impact without encroachment to the occupant survival space when tested in

accordance with Section 4 of SAE J2420 COE Frontal Strength Evaluation Dynamic Loading Heavy Trucks, Section 5 of SAE J2422 Cab Roof Strength Evaluation Quasi –Static 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 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.

OEM WIRING

A custom wiring interface and harness shall be provided and designed to meet the requirements provided by the apparatus manufacturer. This shall include the following circuits/features:

- Remote engine start circuit shall be provided to activate the engine starter solenoid from the aerial apparatus and shall utilize existing cab starter interlocks. The input for starter activation shall be provided and programmed by the apparatus manufacturer through the Weldon V-mux system.

- Remote engine stop circuit shall be provided to shut down the chassis engine from the aerial apparatus. The input for chassis engine shutdown shall be provided and programmed by the apparatus manufacturer through the Weldon V-mux system.

- Additional master power circuit located at apparatus manufacturer chassis interface connector at least 12 gauge in size and capable of supplying 20 amps.

- Additional communication connection for Weldon V-Mux multiplex system shall be provided and located near the apparatus manufacturer chassis interface connector.

- Aerial PTO override SPST guarded toggle switch located in the driver's diagnostic panel and labeled "Aerial PTO Override". When activated, the switch will override standard PTO interlocks and supply direct power to the aerial PTO solenoid for emergency activation.

The custom chassis harness shall also include additional inputs/outputs for Pump Engaged, Marker Lights, Neutral, Park Brake, Aerial Warning Lights, PTO Request, PTO Enable (input), PTO Enable (output), Open Door Beacon, and High Idle.

APPARATUS WIRING PROVISION

An apparatus wiring panel shall be installed in the center dash area behind the rocker switch panel which shall include eight (8) open circuits consisting of three (3) 20 amp, one (1) 30 amp,

three (3) 10 amp, and one (1) 15 amp circuit, with relays and breakers with trigger wires which shall be routed to the rocker switch panel.

MULTIPLEX DISPLAY

The multiplex electrical system shall include (2) Weldon Vista IV displays which shall be located one (1) on the right side of the dash in the switch panel and one (1) on the left side of the dash in the switch panel. The Vista IV displays shall feature full color LCD display screens which include 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 screens shall be video ready for back-up cameras, thermal cameras, and DVD.

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

MULTIPLEX DISPLAY SPECIAL LAYOUT

The Vista display and control screen shall be configured specifically for a virtual button on the control screen to override the park brake interlocked deactivation of the wiper system. This will reset when the park brake is cycled.

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. The laptop connection shall be a panel mounted female type B USB connection point, remotely mounted in the left side foot well.

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 225 amp battery direct 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 set of power and ground studs with supporting battery cables shall be provided at the apparatus interface location on the chassis transmission cross member location and labeled “Aerial EPU”. The studs and battery cables shall be capable of supplying 600 amps and be wired battery direct.

ADDITIONAL ACCESSORY POWER

An additional six (6) position Blue Sea Systems 5025 blade type fuse panel shall be installed on the side wall of the engine tunnel behind the officer's 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.

EXTRA ACCESSORY POWER

An extra 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 located behind the switch panel. 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.

ELECTRICAL SYSTEM WARRANTY

Purchaser shall receive an Electrical System Two (2) Years or 36,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0202. The warranty certificate is incorporated by reference into this proposal and included with this proposal or available upon request.

ENGINE

The chassis engine shall be a Cummins X15 engine. The X15 engine shall be an in-line six (6) cylinder, four cycle diesel powered engine. The engine shall offer a rating of 565 horsepower at 1800 RPM and shall be governed at 2100 RPM.

The torque rating shall feature 1850 foot pounds of torque at 1000 RPM with 912 cubic inches (14.9 liter) of displacement.

The X15 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 2021 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 15W40 CK-4 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 alloy plate. The tunnel shall be a maximum of 46.50 inches wide X 29.00 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. The controls shall be located on the digital dash display.

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 a virtual Vista button and 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 engine is running, 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 system shall be activated by an on/off switch and a low/high selector switch.

ELECTRONIC ENGINE OIL LEVEL INDICATOR

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

FLUID FILLS

The front of the chassis shall accommodate fluid fill for the engine oil through the grille. This area shall also accommodate a check for the engine oil. The transmission, power steering, and coolant fluid fills and checks shall be under the cab. The windshield washer fill shall be accessible through the front left side mid step.

ENGINE DRAIN PLUG

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

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 Pump Boss 400 governor with dual pressure sensors shall be provided for the electronic engine. It shall include a remote mountable control head.

The Pump Boss 400 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 shall also be part of the system.

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 FRC Pump Boss 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 side mount pump panel.

An apparatus interface wiring harness shall also be included which shall be wired to the cab harness interface connectors and shall incorporate circuits with relays to control pump functions. This harness shall control the inputs for the transmission lock up circuits, governor/hand throttle controls and dash display which shall incorporate “Pump Engaged” and “OK to Pump” indicator lights. The harness shall contain circuits for the apparatus builder to wire in a pump switch.

ENGINE PROGRAMMING REMOTE THROTTLE

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

ENGINE PROGRAMMING IDLE SPEED

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

ENGINE AIR INTAKE

The engine air intake system shall include an ember separator. This 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 heavy duty galvanized steel frame. This multilayered screen shall trap embers and allow them to burn out before passing through the pack.

The engine air intake system shall also include an air cleaner mounted above the radiator. This air cleaner shall utilize a replaceable dry type filter element designed to prevent dust and debris from being ingested into the engine. A service cover shall be provided on the housing, reducing the chance of contaminating the air intake system during air filter service.

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

ENGINE FAN DRIVE

The engine cooling system fan shall incorporate a thermostatically controlled, Horton fully variable type fan drive with SmartClutch J-1939 CAN controller. The clutch fan shall override the thermostatic variable speed and function as full on automatically in pump mode.

The variable speed fan clutch only engages at the amount needed for proper cooling to 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. The fan speed shall include a J-1939 CAN clutch controller to receive signal from the engine control module to activate at variable rates of speed. Variable speeds shall be set through thermostatic and engine speed signals to run as efficiently and quietly as required to maintain temperature.

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 be comprised of 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, a 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 injected molded polymer fan with a three (3) piece 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 observe coolant in the system. A cold fill and observation line shall be included

within the frame mounted translucent recovery bottle to monitor the level of the coolant. The surge tank shall have a dual seal cap that meets the engine manufacturer's pressure requirements and allows for expansion and recovery of coolant into a separate integral expansion chamber.

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

The charge air cooler shall be a crossflow 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 components.

ENGINE COOLANT

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

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

ENGINE COOLANT FILTER

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

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

ELECTRONIC COOLANT LEVEL INDICATOR

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

ENGINE PUMP HEAT EXCHANGER

A single bundle type coolant to water heat exchanger shall be installed between the engine and the radiator. The heat exchanger shall be designed to prohibit water from the pump from

coming in contact with the engine coolant. This shall allow the use of water from the discharge side of the pump to assist in cooling the engine.

COOLANT HOSES

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

ENGINE COOLANT OVERFLOW BOTTLE

A remote engine coolant overflow expansion bottle shall be provided in the case of over filling the coolant system. The overflow bottle shall capture the expansion fluid or overfill rather than allow the fluid to drain on the ground.

ENGINE EXHAUST SYSTEM

The exhaust system shall include an end-in end-out horizontally mounted single module after treatment device, and 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 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.

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.

The tail pipe shall have a 7.00 inch offset shifting the exhaust pipe inboard of the exhaust canister to provide additional clearance from the body and frame mounted brackets.

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.

The exhaust flex joint shall not include the thermal exhaust wrap.

EMISSIONS SYSTEMS WARRANTY

Purchaser shall receive a Regulated Emissions Systems Five (5) Years or 100,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0140.

The warranty certificate is incorporated by reference into this proposal and included with this proposal or available upon request.

TRANSMISSION

The drive train shall include an Allison model EVS 4000 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 which shall offer 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	3.51:1
2nd	1.91:1
3rd	1.43:1
4th	1.00:1
5th	0.74:1
6th	0.64:1 (if applicable)
Rev	4.80:1

TRANSMISSION MODE PROGRAMMING

The transmission, upon start-up, will select five (5) speeds of operation. The sixth speed over drive shall be available with the activation of the mode button on the shifting pad.

TRANSMISSION FEATURE PROGRAMMING

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

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/VI-E transmission shall include prognostic diagnostic capabilities. These capabilities shall include the monitoring of the fluid life, filter change indication, and transmission clutch maintenance.

Function ID	Description	Wire assignment
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.

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.

LH PTO

A ten (10) bolt standard duty clutched drive PTO shall be provided by the chassis manufacturer and installed on the transmission. Installation shall include mounting of the PTO and wiring the unit with a control switch.

LH PTO MODEL

A ten (10) bolt Chelsea model 280-GGFJP-B5XD heavy duty transmission driven PTO shall be installed. The clutched shifted PTO is designed specifically for the Allison world transmission and provides an intermittent and continuous torque rating of 360 lb. ft.

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 1:00 o'clock position.

LH PTO CONTROL

The left hand power take off shall be controlled by the transmission. The power take off shall be activated by a locking on/off rocker switch which contains an integral light which shall illuminate upon a positive engagement of the power take off. This switch shall be located on dash.

Required operating conditions for enabling this function are:

- Throttle position is low
- Engine speed is within customer specified constant limits
- Transmission output speed is within customer specified constant limits

Park brake set

PTO PROGRAMMING

The power take off shall be programmed for operator control such that it shall only engage at or below 900 engine RPM and a transmission output speed of 250 RPM. The PTO shall operate in a range up to 4000 engine RPM or a transmission output speed of 5000 RPM. The PTO programming shall provide for automatic disengagement set at a specified engine speed of 4000 RPM, or transmission output speed of 5000 RPM. The range shall be programmed to protect equipment driven from the power take off.

DRIVELINE

All drivelines shall be heavy duty metal tube and equipped with MSI 1810 series universal joints for the main drivelines, and 1710 series for the inter-axle shaft. 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®. The drivelines shall include Meritor brand u-joints with thrust washers.

MIDSHIP PUMP / GEARBOX

A temporary jackshaft driveline and pump mounting brackets shall be installed by the chassis manufacturer to accommodate the midship 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 “B” (short) 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 141.00 inches.

PUMP SHIFT CONTROLS

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

The control lever center position shall exhaust air from both pump and roadsides 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 Racor GreenMAX 6600R fuel filter/water separator as a primary filter. The fuel filter shall have a drain valve and a see-through cover to allow visual inspection of fuel and filter condition. The Racor 6600R shall meet engine requirements for particulate size, collection capacity, removal efficiency, and water removal efficiency. The filter shall be capable of handling a maximum flow rate of 150 gallons per hour.

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

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

FUEL LINES

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

FUEL SHUTOFF VALVE

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

ELECTRIC FUEL PRIMER

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

FUEL COOLER

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

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.

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 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 Method B, results to be 5B minimum. The pencil hardness test per ASTM D3363 shall have a final post-curved pencil hardness of H-2H. The direct impact resistance test per ASTM D2794, 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 components if possible.

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.

FUEL TANK SERVICEABILTY PROVISIONS

The chassis fuel lines, and sender wiring shall have additional length provided so the tank can be easily lowered and removed for service purposes. The additional 12.00 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 magnetic drain plug shall be centered in the bottom of the fuel tank.

FRONT AXLE

The front axle shall be a Hendrickson STEERTEK Non-drive front axle, NXT Fire/Rescue model. The axle shall include a 3.74 inch drop and a 70.87 inch king pin intersection (KPI). The axle shall be a box-shaped fabricated beam with integrated suspension. The axle shall include a conventional style hub with a standard knuckle. The weight capacity for the axle shall be rated to 24,000 pounds.

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

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

FRONT SUSPENSION

The front suspension shall include a parabolic leaf spring pack integrated into the Hendrickson STEERTEK NXT axle consisting of 58.40 inches long and 4.00 inches wide tapered leaf springs and shall feature a military double wrapped front eye. Spring eyes shall have Hendrickson's proprietary threaded pin bushings to increase roll stiffness. The spring capacity shall be rated specifically to the axle configuration from 18,000 and up to 24,000 pounds.

STEERING COLUMN/ WHEEL

The cab shall include a Douglas Autotech steering column which shall include a seven (7) position tilt, a 2.25 inch telescopic adjustment, and an 18.00 inch, four (4) spoke steering wheel located at the driver's position. The steering wheel shall be covered with black polyurethane foam padding.

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 45-degrees to the left and 43-degrees to the right.

POWER STEERING GEAR

The power steering gear shall be a TRW model TAS 85 with an assist cylinder.

CHASSIS ALIGNMENT

The chassis frame rails shall be measured to ensure 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 RT-52-185 tandem drive axle. The axle shall include precision forged, single reduction differential gearing, and shall have a fire service rated capacity of 54,000 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 0.56 of an inch for extra strength and rigidity and a rigid differential case for high axle strength and reduced maintenance.

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

REAR AXLE DIFFERENTIAL LUBRICATION

The rear axle differential shall be lubricated with oil.

REAR AXLE WARRANTY

The rear axle shall be warranted by Meritor for five (5) 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.

REAR AXLE DIFFERENTIAL CONTROL

The tandem axle chassis shall include an inter-axle differential lock, which shall allow both axles to be engaged as drive axles. The inter-axle differential lock shall be controlled by a locking rocker switch on the switch panel. The light on the switch shall illuminate with positive engagement of the inter-axle differential lock.

VEHICLE TOP SPEED

The top speed of the vehicle shall be approximately 65 MPH +/-2 MPH at governed engine RPM.

REAR SUSPENSION

The tandem rear axle shall feature a Neway AD-254 air suspension. Each axle shall be independently suspended for optimum performance. The suspension shall include optimized air springs which shall be mounted to the equalizing beams and integral transverse beams. Adjustable torque rods and adjustable track bars shall also be included. The rear tandem suspension shall include 54.00 inch axle centers.

Dual air height control valves shall be installed to ensure equal frame height on both sides of the vehicle regardless of the load.

The rear suspension shall be run flat compatible at reduced speeds.

The rear suspension capacity shall be rated at 48,000 to 54,000 pounds.

REAR SHOCK ABSORBERS

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

TIRE INTERMITTENT SERVICE RATING

The chassis shall be rated using Intermittent Service ratings provided to the emergency vehicle market by the tire manufacturers as the basis for determining the maximum vehicle load and speed.

FRONT TIRE

The front tires shall be Michelin 425/65R-22.5 20PR "L" tubeless radial XZY3 mixed service tread.

The front tire stamped load capacity shall be 22,800 pounds per axle with a nominal speed rating of 65 miles per hour when properly inflated to 120 pounds per square inch.

The Michelin Intermittent Service Rating maximum load capacity shall be 24,396 pounds per axle with a maximum speed of 65 miles per hour when properly inflated to 120 pounds per square inch.

The Michelin Intermittent Service Rating maximum speed capacity shall be 22,800 pounds per axle with a speed rating of 75 miles per hour when properly inflated to 120 pounds per square inch.

The Michelin Intermittent Service Rating limits the operation of the emergency vehicle to 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 TIRE

The rear tires shall be Michelin 12R-22.5 16PR "H" tubeless radial XZE regional tread.

The rear tire stamped load capacity shall be 27,120 pounds per axle with a speed rating of 75 miles per hour when properly inflated to 120 pounds per square inch.

The Michelin Tire Intermittent Service Rating load capacity shall be 28,880 pounds per axle with a speed rating of 75 miles per hour when properly inflated to 120 pounds per square inch. The Michelin Intermittent Service Rating limits the operation of the emergency vehicle to one (1) hour of loaded travel with a one (1) hour cool down prior to another loaded run.

REAR AXLE RATIO

The rear axle ratio shall be 5.38:1.

TIRE PRESSURE INDICATOR

There shall be electronic chrome LED valve caps shipped loose for installation by the OEM which shall illuminate with a red LED when tire pressure drops 8psi provided. The valve caps are self-calibrating and set to the pressure of the tire upon installation.

FRONT WHEEL

The front wheels shall be Alcoa hub piloted, 22.50 inch X 12.25 inch aluminum wheels. The outer face of the wheels shall feature Alcoa's Dura-Bright® finish 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. The hub piloted mounting system shall provide easy installation and shall include two-piece flange nuts.

REAR WHEEL

The rear wheels shall be Alcoa hub piloted, 22.50 inch X 8.25 inch LvL One™ aluminum wheels with a polished outer surface and Alcoa Dura-Bright® wheel treatment as an integral part of the wheel. The hub piloted mounting system shall provide easy installation and shall include two-piece flange nuts.

WHEEL TRIM

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

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

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

BRAKE SYSTEM

A rapid build-up air brake system shall be provided. The air brake system shall include, at a minimum, a three (3) air tank, four (4) reservoir system with a total of 6236 cubic inch of air capacity. A floor mounted treadle valve shall be mounted inside the cab for graduated control of applying and releasing the brakes. An inversion valve shall be installed to provide a service brake application in the unlikely event of primary air supply loss. All air reservoirs provided on the chassis shall be labeled for identification.

The tandem 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 six (6) sensor, six (6) modulator Anti-lock Braking System (ABS) shall be installed on the front and tandem rear axles in order to prevent the brakes from locking or skidding while braking during hard stops or on icy or wet surfaces. This in turn shall allow the driver to maintain steering control under heavy braking and in most instances, shorten the braking distance. The electronic monitoring system shall incorporate diagonal circuitry which shall monitor wheel speed during braking through a sensor and tone ring on each wheel. A dash mounted ABS lamp shall be provided to notify the driver of a system malfunction. The ABS system shall automatically disengage the auxiliary braking system device when required. The speedometer screen shall be capable of reporting all active defaults using PID/SID and FMI standards.

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

A momentary rocker 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 and the light on the rocker switch 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.

SUPPLEMENTAL BRAKE

A supplemental brake engagement shall be supplied that can only be engaged while the rear spring brakes are engaged. In addition to the mechanical rear brake engagement, the front service brakes shall also be engaged via air pressure, providing additional braking capability. Front service brake activation shall be accomplished with activation of the rear mechanical park brake valve.

PARK BRAKE CONTROL

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

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.

The control shall include a protective guard which shall prevent accidental activation of the parking brake and still allow proper actuation of the control.

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 to the frame behind the battery box on the left hand side outboard on an aerial apparatus bracket.

FRONT BRAKE CHAMBERS

The front brakes shall be provided with type 24 brake chambers as supplied with the Hendrickson STEERTEK NXT axle.

REAR BRAKE CHAMBERS

The rear axle shall include MGM 24/30 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.

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.

MOISTURE EJECTORS

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

AIR SUPPLY LINES

The air system on the chassis shall be plumbed with color coded reinforced nylon tubing air lines. The primary (rear) brake line shall be green, the secondary (front) brake line red, the parking brake line orange and the auxiliary (outlet) will be blue.

Push to connect type fittings shall be used on the nylon tubing. All drop hoses shall include fiber reinforced neoprene covered hoses.

AIR TANK SPACERS

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

REAR AIR TANK MOUNTING

If a combination of wheelbase, 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 224.5 inches.

REAR OVERHANG

The chassis rear overhang shall be 106.00 inches.

FRAME

The frame shall consist of triple side rails and cross members forming a ladder style frame. The side 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 X 0.38 inches thick, with an inner channel 9.44 inches high X 3.13 inches deep X 0.38 inches thick, and a second inner channel, 8.55 inches high X 2.75 inches deep X 0.25 inches thick which shall be provided extending from the rear of the cab to the forward rear suspension cross member. Each rail shall be constructed of 110,000 psi minimum yield high strength low alloy steel. The triple rail section shall be rated by a Resistance Bending Moment (RBM) minimum of 3,921,500 inch pounds and have a minimum section modulus of 35.65 cubic inches. The frame shall measure 35.00 inches in width.

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

Proposals including heat treated rails shall not be considered. Heat treating frame rails produces rails that are not uniform in their mechanical properties throughout the length of the rail. Rails made of high strength, low alloy steel are already at the required yield strength prior to forming the rail.

A minimum of seven (7) fully gusseted 0.25 inch thick cross members shall be installed. The inclusion of the body mounting, or bumper mounting shall not be considered as a cross member. The cross members shall be attached using zinc coated grade 8 fasteners.

The bolt heads shall be flanged type, held in place by distorted thread flanged lock nuts. Each cross member shall be mounted to the frame rails utilizing a minimum of 0.25 inch thick gusset reinforcement plates at all corners balancing the area of force throughout the entire frame.

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

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

FRAME CLEAR AREA

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

FRAME PAINT

The frame shall be hot dip galvanized prior to assembly and attachment of any components. The components that shall be galvanized shall include:

- Main frame “C” channel or channels
- Front splayed rails and fish plates
- Cross members (excluding suspension cross members)
- Cross member gussets
- Fuel tank mounting brackets
- Fuel tank straps (unless material/finish is specified in 3130 subcat)
- Air tank mounting brackets (unless material/finish is specified in 3205, 3305, or 2232 subcat)
- Exhaust mounting brackets
- Air cleaner skid plate
    - Radiator skid plate
- Battery supports
- Battery trays (unless material/finish is specified in 5106 subcat)
- Battery covers (unless material/finish is specified in 5107 subcat)

The frame parts which are not galvanized shall be powder coated prior to any attachment of components. Parts which shall be powder coated shall include but are not limited to:

- Bumper extensions
- Steering gear bracket
- Air tanks (unless color coded tanks are specified in 3205 subcat)

Other non-galvanized under carriage components which are received from the suppliers with coatings already applied shall include but are not limited to:

- Suspension components
- Front and rear axles

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

FRAME PAINT - MISCELLANEOUS

There shall be an RTV type sealant applied to the seams between the frame rail and the frame liner(s) to help prevent water intrusion between the frame rails. The sealant shall be applied to all seams along the length of the frame and at the top, front, and rear ends of the liner(s). The sealant shall be applied after the frame rails have been assembled and painted.

FRAME ASSEMBLY STRUCTURAL

Purchaser shall receive a Frame Assembly Structural Twenty (20) Years or 100,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0304. The warranty certificate is incorporated by reference into this proposal and included with this proposal or available upon request.

FRAME RAIL CORROSION

Purchaser shall receive a Frame Rail Corrosion (Zinc Plate and Powder Coat) Twenty Five (25) Years or 150,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0316. The warranty certificate is incorporated by reference into this proposal and included with this proposal or available upon request.

FRAME COMPONENTS CORROSION

Purchaser shall receive a Frame Components Corrosion (Zinc Plate) Twenty (20) Years or 132,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0314. The warranty certificate is incorporated by reference into this proposal and included with this proposal or available upon request.

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 104.50 inches wide with angled front corners.

The bumper shall be primed and painted as specified.

FRONT BUMPER EXTENSION LENGTH

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

FRONT BUMPER PAINT

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

FRONT BUMPER APRON

The 18.00 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 DISCHARGE

The chassis shall include frame mounted 2.00 inch diameter plumbed pipe intended for use as a discharge trash line. The discharge pipe shall be routed from the left hand front splay rail area behind the bumper to the area rear of the front axle, ahead of the battery box.

The discharge shall pipe shall be a 2.00 inch stainless steel schedule 10 tube. The discharge shall include a Victaulic groove for connecting to the pump and discharge hose plumbing on each end of the tube.

The apparatus manufacturer shall plumb the discharge pipe to the pump and shall provide all valves as required.

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 include a notched cover constructed of 0.19 inch thick bright embossed aluminum tread plate. The notch shall be located in the left 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

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 electromechanical 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 mounting hardware designed to recess or flush mount.

MECHANICAL SIREN LOCATION

The siren shall be recess mounted on the left side of the front fascia of the bumper approximately in the center of the flat surface between the bumper radius and the frame rail. The siren shall be mounted completely behind the face of the bumper to protect the siren from damage.

AIR HORN

The front bumper shall include two (2) Hadley brand E-Tone air horns which shall measure 21.00 inches long with a 6.00 inch round flare. The air horns shall be trumpet style with a chrome finish on the exterior and a painted finish deep inside the trumpet.

AIR HORN LOCATION

The air horns shall be recess mounted in the front bumper face on the right side of the bumper in the inboard and outboard positions relative to the right hand frame rail.

AIR HORN RESERVOIR

One (1) air 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 one (1) Cast Products Inc. model SA4301, 100 watt speaker provided. The speaker shall measure 6.20 inches tall X 7.36 inches wide X 3.06 inches deep. The speaker shall include a flat mounting flange which shall be polished aluminum.

ELECTRONIC SIREN SPEAKER LOCATION

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

FRONT BUMPER TOW HOOKS

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

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 TILT LOCK DOWN INDICATOR

The cab dash shall include a message located within the dual air pressure gauge which shall alert the driver when the cab is unlocked and ajar. The alert message shall cease to be displayed when the cab is in the fully lowered position and the hold down hooks are secured and locked to the cab mounts.

In addition to the alert message an audible alarm shall sound when the cab is unlocked and ajar and the parking brake is released.

CAB WINDSHIELD

The cab windshield shall have a surface area of 2969.88 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 door panel ledge 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.

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 door panel ledge 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 severe 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.

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 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.

The chassis manufacturer recommends that the overall climate system performance be based off third-party testing in accordance with the Society of Automotive Engineering standards as a complete system.

Individual component level BTU ratings is not an accurate indicator of the performance capability of the completed system. System individual component BTU ratings:

- Air conditioning evaporator total BTU/HR: 82,000
- Air conditioning condenser total BTU/HR: 59,000
- Heater coil total BTU/HR: 98,000

Performance data specified is based on testing performed by an independent third-party test facility using a medium four-door 10" raised roof cab 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. Drain tubes located on the left and right side of the air conditioning system shall run outward towards the cab wall and down thru the cab floor near the "B" pillar area to assist with the removal of condensation.

CLIMATE CONTROL ACTIVATION

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

HVAC OVERHEAD COVER PAINT

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

A/C CONDENSER LOCATION

A roof mounted A/C condenser shall be installed on the left side of the cab, mid-roof.

A/C COMPRESSOR

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

The chassis manufacturer recommends that the overall climate system performance be based off third-party testing in accordance with the Society of Automotive Engineering standards as a complete system.

Individual component level ratings are not an accurate indicator of the performance capability of the completed system.

Refrigerant Compressor displacement: 19.1 cubic inches per revolution.

UNDER CAB INSULATION

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

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

The engine tunnel insulation shall measure approximately 0.30 inch thick including a multi-layer foil faced glass cloth and polyester fiber layer.

The foil surface acts as protection against heat, 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 MVSS 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 acrylic pressure sensitive adhesive. In addition, the insulation shall have an expanded aluminum overlay installed to assist in retaining the insulation tight against the engine tunnel surfaces and the underside of the cab floor. The cab floor overlay shall use aluminum pins with hard hat, hold in place fastening heads.

INTERIOR TRIM FLOOR MAT

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.

The floor shall have an overlay of 3003-H22 aluminum tread plate which shall feature a bedliner spray on bedliner coating. The aluminum plate shall be held down with screws and shall feature a flange wrapping downward into each stepwell, eliminating the need for any additional trim

where the cab floor and the step wells meet. All exposed seams shall be sealed with silicone caulk matching the color of the floor mat to reduce the chance of moisture and debris retention.

INTERIOR TRIM

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. The center dash electrical access cover shall include a gas cylinder stay which shall hold the cover open during maintenance.

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 shall be constructed of 5052-H32 Marine Grade, 0.13 of an inch thick aluminum plate and shall include a glove compartment with a hinged door and a Mobile Data Terminal (MDT) provision. The glove compartment size will measure 14.00 inches wide X 6.38 inches high X 5.88 inches deep. The MDT provision shall be provided above the glove compartment.

ENGINE TUNNEL TRIM

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

POWER POINT DASH MOUNT

The cab shall include two (2) dual universal serial bus (USB) charging receptacles in the cab dash switch panel to provide a power source for USB chargeable electrical equipment. Each dual USB receptacle shall include two ports and shall be capable of up to a 5 Volt 2.1 amp output. Port 1 is optimized for fast charging at 1 amp. Port 2 is optimized for fast charging up to 2.1 amps, when used individually. The receptacles shall be wired battery direct.

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 embossed perforations and diamond shaped cutout. The perforations and cutouts shall allow water and other debris to flow through rather than becoming trapped within the stepping surface. The step shall feature a splash guard to reduce water and debris from splashing in to the step. The splash guard shall have drainage holes beneath the back of the step to allow debris and water to flow through rather than becoming trapped within the stepping surface. The stainless steel material shall have a number 8 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.

UNDER CAB ACCESS DOOR

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

INTERIOR DOOR TRIM

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

DOOR TRIM CUSTOMER NAMEPLATE

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

CAB DOOR TRIM REFLECTIVE

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

INTERIOR GRAB HANDLE "A" PILLAR

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 DA sand finish to assist personnel entering and exiting the cab.

INTERIOR GRAB HANDLE REAR DOOR

A DA sanded 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 SUNVISOR

The header shall include two (2) sun visors, one each side forward of the driver and officer seating positions above the windshield. Each sun visor shall be constructed of Masonite and covered with padded vinyl trim.

INTERIOR FLOOR MAT COLOR

The cab interior floor mat shall be black in color.

CAB PAINT INTERIOR DOOR TRIM

The inner door panel surfaces shall be painted with multi-tone onyx black texture finish.

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.

FLOOR INTERIOR PAINT

The metal surfaces on the floor of the cab shall feature a black spray on bedliner coating.

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 five (5) rocker switch positions in a single row configuration in the center panel and one (1) switch in the panel in customer specified location.

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

SWITCHES LEFT PANEL

The left dash panel shall include five (5) switches. There shall be three (3) across the top of the panel with two (2) below. Two (2) of the top row of switches shall be rocker type and the left one (1) shall be the windshield wiper/washer control switch. The lower switches shall be a rocker type switch.

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

SWITCHES RIGHT PANEL

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

SEAT BELT WARNING

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

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 applicable audible alarm shall remain active until all occupied seats have the seat belts fastened.

SEAT MATERIAL

The Bostrom Firefighter seats shall include a covering of extra high strength, tear resistant, and waterproof fabric made of durable Durawear Plus™ 1800 denier 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. Durawear Plus shall include low seam stitching to eliminate seam wear. Durawear Plus™ meets or exceeds specification of the common trade name Imperial 1800. The material meets FMVSS 302 flammability requirements.

Seats shall be Foam Block™ encapsulated foam with Zip Clean covers. The encapsulated Foam Block™ feature shall resist gas and liquid absorption in the cushion. Seat cushions, head rest and side bolsters shall zip off using a heavy duty skirted zipper to allow for quick removal and easy cleaning. All Zip off covers are designed for machine washing and air drying.

One (1) extra seat cushion and applicable back cover(s) shall be provided per seating position.

If applicable, Theatre style seats located in the cab shall be 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 back shall include the “Spartan” logo. 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 500 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 ABTS feature shall also include the RiteHite™ shoulder adjustment feature to provide enhanced comfort and safety by allowing customized seat belt fit.

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

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

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

SEAT BACK DRIVER

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

SEAT MOUNTING DRIVER

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

ADDITIONAL SEAT COVER DRIVER

One (1) set of additional seat cushion and seat back covers shall be provided for the driver's position. The seat back cover shall either be a single piece for non-SCBA backs or a set of covers for bolsters and head cushions around the SCBA backs, dependent on seat back style.

SEAT OFFICER

The officer's seat shall be a H.O. Bostrom 500 Series Sierra seat model. 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 ABTS feature shall also include the RiteHite™ shoulder adjustment feature to provide enhanced comfort and safety by allowing customized seat belt fit.

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 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 be installed in an ergonomic position in relation to the cab dash.

ADDITIONAL SEAT COVER OFFICER

One (1) set of additional seat cushion and seat back covers shall be provided for the officer's position. The seat back cover shall either be a single piece for non-SCBA backs or a set of covers for bolsters and head cushions around the SCBA backs, dependent on seat back style.

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 two (2) rear facing crew seats, which include one (1) located directly behind the left side front seat and one (1) located directly behind the right side front seat.

SEAT CREW REAR FACING OUTER

The crew area shall include a seat in the rear facing outboard position which shall be a H.O. Bostrom 500 Series Firefighter model seat. The seat shall feature a tapered and padded seat, and cushion. The seat and cushion shall be spring load hinged and compact in design for additional room. The seat shall include a "Fold and Hold" feature so that the cushion shall remain in the seated position and simply touched to flip up.

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 ABTS feature shall also include the

RiteHite™ shoulder adjustment feature to provide enhanced comfort and safety by allowing customized seat belt fit.

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

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

SEAT BACK REAR FACING OUTER

The 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.

ADDITIONAL SEAT COVER RFO

One (1) set of additional seat cushion and seat back covers shall be provided for each rear facing outer position. The seat back cover shall either be a single piece for non-SCBA backs or a set of covers for bolsters and head cushions around the SCBA backs, dependent on seat back style in each position.

SEAT FORWARD FACING CENTER LOCATION

The crew area shall include two (2) forward facing center crew seats with both located at the center of the rear wall.

SEAT CREW FORWARD FACING CENTER

The forward facing center seat shall be a H.O. Bostrom 500 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 and cushion shall be hinged and compact in design for additional room. The seat shall include a “Fold and Hold” feature so that the cushion shall remain in the seated position and simply touched to flip up.

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 ABTS feature shall also include the RiteHite™ shoulder adjustment feature to provide enhanced comfort and safety by allowing customized seat belt fit.

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

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

SEAT BACK FORWARD FACING CENTER

The 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.

ADDITIONAL SEAT COVER FFC

One (1) set of additional seat cushion and seat back covers shall be provided for each forward-facing center position. The seat back cover shall either be a single piece for non-SCBA backs or a set of covers for bolsters and head cushions around the SCBA backs, dependent on seat back style in each position.

SEAT FRAME FORWARD FACING

The forward facing crew area seating positions shall include a full width, integrated seat mounting surface which shall be the lower interior surface of the rear cab roof modification extension. The seat mounting area shall span the full width of the cab and the full depth of the cab roof modification extension. The seat mounting area shall be painted with the same color as the remaining interior of the cab.

SEAT MOUNTING FORWARD FACING CENTER

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

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 triple arm linkage wiper system which shall clear the windshield of water, ice and debris. There shall be two (2) windshield wipers; each shall be affixed to a radial arm. The wiper motor shall be activated by an intermittent wiper control located within easy reach of the driver's position. The windshield wipers shall be interlocked with the park brake allowing activation only when the park brake is released.

There shall be virtual button on the Vista display and control screen to override the park brake deactivation. This will reset when the park brake is cycled.

ELECTRONIC WINDSHIELD FLUID LEVEL INDICATOR

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

CAB DOOR HARDWARE

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

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

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

The exterior pull handles shall include a scuff plate behind the handle constructed of polished stainless steel to help protect the cab finish.

DOOR LOCKS

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

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 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 red reflective tape.

LIGHTED GRAB HANDLES

The grab rails shall include a 12 volt, 17.00 inch long clear LED light to provide an increased margin of safety for nighttime cab entry and egress.

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.

REARVIEW MIRRORS

Retrac Aerodynamic West Coast style dual vision mirror heads model 613315 shall be provided and installed each of the front cab doors.

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

The mirrors shall measure 8.00 inches wide X 19.00 inches high and shall include an integral convex mirror in the mirror head below the flat glass to provide wider field of vision. The flat and convex mirrors shall be motorized with remote horizontal and vertical adjustment. The control

switches shall be mounted within easy reach of the driver. The flat and convex mirrors shall be heated for defrosting in severe cold weather conditions.

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

REARVIEW MIRROR HEAT SWITCH

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

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 SAE 304 polished stainless steel.

MUD FLAPS FRONT

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

CAB EXTERIOR FRONT & SIDE EMBLEMS

The cab shall include three (3) Spartan emblems. There shall be one (1) installed on the front air intake grille and one (1) emblem on each of the cab sides. The cab shall also include one (1) Advanced Protection System shield emblem on each front door.

IGNITION

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

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

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

BATTERY

The single start electrical system shall include six (6) Harris BCI 31 925 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) steel battery trays located on the left side and right side of the chassis, securely bolted to the frame rails. The battery trays shall be coated with the same material as the frame.

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

BATTERY BOX COVER

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

BATTERY CABLE

The starting system shall include cables which shall be protected by 275 degree F. minimum high temperature flame retardant loom, sealed 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, 8.00 inches apart. 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.

STARTER MOTOR

The single start electrical system shall include a Delco brand starter motor.

BATTERY CONDITIONER

A Kussmaul Auto Charge 40 LPC battery conditioner shall be supplied. The battery conditioner shall provide a 40 amp output for the chassis batteries and a 15 amp output circuit for accessory loads. The battery conditioner shall be mounted in the cab in the LH rear facing outer seating position.

BATTERY CONDITIONER DISPLAY

A Kussmaul battery conditioner display shall be supplied. The battery conditioner display shall be mounted in the cab, viewable through the cab mid side window behind the left front door.

AUXILIARY AIR COMPRESSOR

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

ELECTRICAL INLET LOCATION

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

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 40 LPC Charger - 5 Amps
Kussmaul 40/20 Charger - 8.5 Amps
Kussmaul 80 LPC Charger - 13 Amps
Kussmaul EV-40 - 6.2 Amps
Blue Sea P12 7532 - 7.5 Amps
Iota DLS-45/IQ4 - 11 Amps
1000W Engine Heater - 8.33 Amps
1500W Engine Heater - 12.5 Amps
120V Air Compressor - 4.2 Amps
120V Dometic HVAC - 15 Amps

ELECTRICAL INLET CONNECTION

The electrical inlet shall be connected to the battery conditioner.

ELECTRICAL INLET COLOR

The electrical inlet connection shall include a red cover.

HEADLIGHTS

The cab front shall include two (2) FireTech rectangular LED headlamps with high/low beam in the same housing and two (2) separate FireTech LED high beam only headlamps mounted in bright chrome bezels.

HEADLIGHT LOCATION

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

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 radius mount housing above and outboard of the front warning and head lamps.

SIDE TURN/MARKER LIGHTS

The sides of the cab shall include two (2) Tecniq S170 LED side marker lights which shall be provided just behind the front cab radius corners. The lights shall be amber with chrome bezels.

MARKER AND ICC LIGHTS

In accordance with FMVSS, there shall be five (5) Tecniq S170 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. The lights shall be amber with chrome bezels.

HEADLIGHT AND MARKER LIGHT ACTIVATION

The headlights and marker lights shall be controlled via a virtual button on the Vista display. The rotary/joystick control of the Graphical Instrument Cluster shall function as a dimmer to adjust the brightness of the dash lights. The headlamps shall be equipped with the "Daytime Running" light feature, which shall illuminate the headlights when the ignition switch is in the "On" position and the parking brake is released.

LIGHTBAR SWITCH

The light bar shall be controlled through a virtual button on the Vista display and control screen. There shall be an additional button located on the Vista display and control screen to control the clear lights.

INTERIOR OVERHEAD LIGHTS

The cab shall include a LED dome lamp located over each door. The lights shall include push switches on each lamp to activate both the clear and red portions of the light individually.

INTERIOR OVERHEAD LIGHTS ACTIVATION

The clear portion of each lamp shall be activated by opening the respective door and via the multiplex display.

LIGHTBAR PROVISION

There shall be two (2) light bars installed on the cab roof. The light bars shall be provided and installed by the chassis manufacturer. The light bar installation shall include mounting and wiring to a control switch on the cab dash.

CAB FRONT LIGHTBAR MODEL

The cab shall be provided with two (2) Whelen model F4NMINI light bars. Each light bar shall be 21.50 inches in length and feature eight (8) customizable pods.

See the light bar layout for specific details.

FRONT SCENE LIGHTS

The front of the cab shall include two (2) HiViz model Firetech FT-MB-12-FT-W scene lights installed on the brow of the cab.

Each lamp head shall operate on 12 volt DC and incorporate a 12 LED optic that combines both spot and flood lighting. Each lamp head shall draw 5.0 amps, generate 6,336 total lumens, and measure approximately 2.00 inches in height X 16.00 inches in width. The lamp heads and brackets shall be powder coated white.

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.

FRONT SCENE LIGHTS ACTIVATION

The front scene lighting shall be activated by a virtual button on the Vista display and control screen.

SIDE SCENE LIGHTS

The cab shall include two (2) Whelen M9 LED scene lights, one (1) each side which shall be surface mounted. The Whelen lights shall provide directional lighting from twenty four (24) Super-LEDs and a clear gradient lens. The scene light shall have specialized TIR optics for ideal scene illumination.

SIDE SCENE LIGHT LOCATION

The scene lighting located on the left and right sides of the cab shall be mounted in the upper forward portion of the cab between the front and rear crew doors.

SIDE SCENE ACTIVATION

The scene lights shall be activated by two (2) rocker switches located in the switch panel, one (1) for each light.

GROUND LIGHTS

Each door shall include a Tecniq T44 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.

GROUND LIGHTS

The ground lighting shall be activated when the parking brake is set, by the opening of the door on the respective cab side, and through a virtual button on the Vista display and control screen.

UNDER BUMPER LIGHTS

There shall be two (2) 4.00 inch round LED NFPA compliant light heads mounted under the bumper. The lights shall include a polycarbonate lens, a housing which is vibration welded, and LED's which shall be shock mounted for extended life. The under bumper ground lighting shall be activated with the park brake, when any cab door opens, or when the vehicle is placed in reverse.

LOWER CAB STEP LIGHTS

The middle step located at each door shall include a Tecniq T44 LED light which shall activate with the opening of the respective door. The lights shall include a polycarbonate lens, a housing which is vibration welded and LEDs which shall be shock mounted for extended life.

INTERMEDIATE STEP LIGHTS

The intermediate step well area at each door shall include a TecNiq D06 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.

MAP LIGHTS

A Roxter gooseneck style map light shall be provided. The light shall have a clear bulb and a control switch on the base. The light shall be located on the right hand side of the dash.

ENGINE COMPARTMENT LIGHT

There shall be a 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.

DO NOT MOVE APPARATUS LIGHT

The front headliner of the cab shall include a flashing red TecNiq K50 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 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. 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.

INBOARD FRONT WARNING LIGHTS COLOR

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

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 V-Series LED intersection warning lights with a chrome bezel, one (1) each side. The lights shall feature multiple flash patterns including steady burn.

INTERSECTION WARNING LIGHTS COLOR

The intersection lights shall be red with a clear lens.

INTERSECTION WARNING LIGHTS LOCATION

The intersection lights shall be mounted centered front to rear on the flat portion of the side of the bumper tail.

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 with clear lens.

SIDE WARNING LIGHTS LOCATION

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

SIDE AND INTERSECTION WARNING SWITCH

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

REAR WARNING LIGHTS

The cab shall be prewired and contain a cutout for a Whelen TACTL5 Traffic Advisor control head to be installed by the body builder. The prewire shall be coiled under the center dash panel.

Wiring provisions shall be provided routed to the rear of the frame for OEM installation of up to eight (8) individual traffic advisor warning lights rated at no more than one (1) amp each.

The power to the control head shall be ignition switched and activation dependent upon the state of the controllers switched position upon ignition.

AUXILIARY GROUND/PERIMETER LIGHTS

There shall be two (2) ground/perimeter lights integrated with the V-Series intersection warning lights. The ground/perimeter function of the V-series lights shall be activated with the vehicle ground lighting activation circuit and with respective turn signal.

INTERIOR DOOR OPEN WARNING LIGHTS

The interior of each door shall include one (1) 15.87 inch long X 0.73 inch tall amber Weldon LED warning light. The light shall be located on the upper portion of the door frame to be visible when a person is standing in front of the door while entering or exiting the cab. Each light shall activate with a scrolling directional flash pattern which moves from inside to outside when the door is in the open position. This shall serve as a warning to oncoming traffic.

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.

STEERING WHEEL 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.

AUDIBLE WARNING RH FOOT SWITCH

A foot switch wired to actuate the mechanical siren(s) shall be supplied for installation in the front section of the cab for officer actuation.

MECHANICAL SIREN FOOT SWITCH RH

The mechanical siren foot switch shall be a Linemaster model 491-S.

MECHANICAL SIREN FOOT SWITCH RH LOCATION

The mechanical siren foot switch shall be temporarily tied up with a coiled wire drop at the firewall inboard for installation by the customer on the right hand side accessible to the officer.

AUDIBLE WARNING RH FOOT SWITCH BRACKET

An individual 30.00 degree angled bracket shall be shipped loose with the chassis for installation of each officer accessible foot switch by the customer.

AIR HORN AUXILIARY ACTIVATION

The air horn activation shall be accomplished by a single right hand side lanyard cable accessible to the officer. An air horn activation circuit shall be provided to the chassis harness pump panel harness connector.

MECHANICAL SIREN BRAKE/AUXILIARY ACTIVATION

A red momentary siren brake rocker switch shall be provided in the switch panel on the dash.

MECHANICAL SIREN INTERLOCK

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

BACK-UP ALARM

An ECCO model 575 backup alarm shall be installed at the rear of the chassis with an output level of 107 dB. The alarm shall automatically activate when the transmission is placed in reverse.

INSTRUMENTATION

An ergonomically designed Graphical Instrument Cluster (GIC) shall be provided that combines gauges, telltales, warning messages, and advanced diagnostic capabilities into a single 12.3 inch digital display. The display screen shall have an anti-reflective coating and include a rotary/joystick control for user interaction with the display.

The GIC shall include a vehicle odometer which displays total vehicle distance traveled. The GIC shall also include two vehicle trip odometers (TRIP A and TRIP B) which indicate the distance traveled and average fuel economy for each respective trip. The operator may select which odometer is displayed and may reset either trip odometer through the on-screen display. The GIC shall include an engine hour meter which displays the total engine hours of operation.

The gauges shall have high-contrast white scales with orange pointers. The following gauges shall be included on the display:

- Speedometer that indicates vehicle speed. The scale on the speedometer shall read from 0 to 100 MPH. A numerical display of vehicle speed shall also be shown on the gauge.

- Tachometer that indicates engine speed. The scale of the tachometer shall read from 0 to 3000 RPM.

- Primary and secondary air pressure gauges that indicate the pressure in the primary and secondary air systems. The scale of the air pressure gauges shall read from 0 to 160 pounds per square inch (PSI). The gauge icon and scale shall turn amber when the system pressure drops below 70 PSI. The icon and scale shall turn red when the system pressure drops below 62 PSI. An audible alarm shall also sound when air pressure is low.

- Fuel gauge. The fuel gauge shall read from empty to full as a fraction of full tank capacity. The gauge icon and scale shall turn amber when the fuel level is below 1/8th tank capacity (1/4th tank in pump mode). An audible alarm shall also sound with low fuel level.

- Diesel exhaust fluid (DEF) gauge. The DEF gauge shall read from empty to full as a fraction of full tank capacity. The gauge icon and scale shall turn amber, and an audible alarm shall sound to indicate low DEF level.

- Engine oil pressure gauge. The scale of the engine oil pressure gauge shall read from 0 to 100 PSI. The gauge icon and scale shall turn red, and an audible alarm shall sound to indicate low oil pressure.

- Engine coolant temperature gauge. The scale of the coolant temperature shall read from 100 to 250 degrees Fahrenheit (°F). The gauge icon and scale shall turn red, and an audible alarm shall sound to indicate high coolant temperature.

- Voltmeter indicating chassis system voltage. The scale of the voltmeter shall be from 10 to 18 volts. The gauge icon and scale shall turn red, and an audible alarm shall sound when the system voltage drops below 11.8 volts for more than 120 seconds in accordance with the requirements of NFPA 1901. The gauge icon and scale shall turn red, and an audible alarm shall sound when the system voltage rises above 15.5 volts for more than 5 seconds.

- Transmission temperature gauge. The scale of the transmission temperature shall read from 100 to 300 degrees Fahrenheit (°F). The gauge icon and scale shall turn amber, and an audible alarm shall sound to indicate high transmission temperature.

The GIC shall include thirty-six (36) colored telltales to indicate vehicle operating conditions. The GIC shall provide text-based warning messages to accompany all telltales. The GIC shall contain an audible alarm capable of providing different alert sounds based on the type of warning. The audible alarm shall be capable of being heard from all seating positions in the cab.

The operator shall be able to silence active alarms that are permitted to be silenced by applicable regulations. The GIC shall contain the following indicators and produce the following audible alarms when supplied in conjunction with applicable configurations:

RED TELLTALES

- Air Filter Restriction - indicates restriction of the engine air intake filter
- Air Pressure (Primary) – indicates critically low primary system air pressure
- Air Pressure (Secondary) – indicates critically low secondary system air pressure
- Cab Tilt Warning - indicates the cab tilt system locks are not engaged
- Coolant Temperature – indicates high engine coolant temperature
- Low Coolant - indicates critically low engine coolant
- Oil Pressure – indicates critically low engine oil pressure
- Park Brake - indicates parking brake is set
- Seat Belt - indicates a seat belt violation
- Stop Engine - indicates critical engine fault
- Voltage – indicates critically low or high system voltage

AMBER TELLTALES

- Anti-Lock Brake System (ABS) - indicates anti-lock brake system fault
- Check Engine - indicates engine fault
- Check Transmission - indicates transmission fault
- Diesel Exhaust Fluid (DEF) level – indicates low DEF level
- Diesel Particulate Filter (DPF) - indicates restriction of the diesel particulate filter
- Electronic Stability Control (ESC) – indicates active electronic stability control system
- Fuel Level – indicates low fuel
- High Exhaust System Temperature (HEST) – indicates elevated exhaust temperature
- Malfunction Indicator Lamp (MIL) - indicates an engine emissions system fault
- Regen Inhibit - indicates regeneration of the DPF has been inhibited by the operator
- Transmission Temperature – indicates high transmission or transmission retarder temperature
- Transmission Range Inhibit - indicates a transmission operation is prevented and requested shift into gear may not occur
- Wait to Start - indicates active engine air preheat cycle
- Water in Fuel - indicates presence of water in fuel filter
- Windshield Washer Fluid – indicates low washer fluid

GREEN TELLTALES

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

BLUE TELLTALES

- High Beam indicator

AUDIBLE ALARMS

- ABS System Fault
- Air Filter Restriction
- Cab Tilt Warning
- Check Engine
- Check Transmission
- Do Not Move Apparatus (open door/compartment)
- DPF Restriction
- High Coolant Temperature
- High or Low System Voltage
- High Transmission Temperature
- Idle Shutdown
- Low Air Pressure
- Low Coolant Level
- Low DEF Level
- Low Engine Oil Pressure
- Low Fuel
- Seatbelt Warning
- Stop Engine
- Turn Signal On
- Water in Fuel

The GIC shall allow the user to configure settings through an on-screen menu. The following settings shall be adjustable by the user:

- Distance/Speed Units – English (miles/MPH) or metric (kilometers/KPH)
- Temperature Units – degrees Fahrenheit (°F) or degrees Celsius (°C)
- Pressure Units – pounds per square inch (PSI) or kilopascals (kPA)
- Odometer/Trip odometer–chose which odometer is displayed and reset trip odometers
- Display Brightness – adjust brightness levels for both day and night settings
- Volume – adjust volume of display speaker

- Auxiliary Gauges – configure location of auxiliary gauges

The GIC shall include on-screen control of the diesel particulate filter (DPF). The GIC shall be capable of initiating and halting a manual DPF regeneration cycle. Also, the GIC shall be capable of inhibiting DPF regeneration when not desired by the operator.

The GIC shall be capable of displaying detailed diagnostic information. Diagnostic information screens shall only be accessible when the park brake is set to prevent unsafe operation of the vehicle. The following information shall be available through the on-screen menu:

- On-Board Diagnostics (OBD) faults – display of all active OBD faults, including the system reporting the fault, the suspect parameter number (SPN), and the failure mode identifier (FMI)
- Messages– display a list of all active warning messages and the status of alarms
- Vehicle Info – display of broadcast chassis information, including Vehicle Identification Number (VIN)
- Pump Interlocks – display pump interlocks status, engine speed, and transmission output speed
- Input/Output Diagnostics – display the state of all wired inputs and outputs to the GIC, as well as rotary/joystick control diagnostics
- Symbol Legend – display a glossary of all symbols and icons used on the GIC
- J1939 Databus Info – display a list of all electronic control units (ECUs) communicating on the vehicle J1939 databus and display a list of all current message data on J1939

BACKLIGHTING COLOR

The digital dash instrumentation gauges shall display in white, and the switch panel legends shall be backlit using red LED backlighting.

HOUR METER

An hour meter shall be included within the digital dash display which shall measure the amount of hours the PTO has been operated. The hour meter shall be wired to the left hand PTO.

RADIO

A Jensen radio with weather band, AM/FM stereo receiver, and four (4) speakers shall be installed in the cab. The radio shall include rear RCA input pigtail connector, satellite radio capability, and a covered front auxiliary mini stereo input with iPod ready USB jack. The radio shall be installed in the left hand overhead position. The speakers shall be installed inside the cab with two (2) speakers recessed overhead in the front portion of the cab rearward of the windshields 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 RIGHT HAND

One (1) Audiovox Voyager heavy duty rearview HD box shaped camera shall be mounted on the officer side of the cab above the front door. The camera display shall activate when the right side turn signal is activated.

CAMERA REAR

One (1) Audiovox Voyager heavy duty box shaped HD camera shall be shipped loose for OEM installation in the body to afford the driver a clear view to the rear of the vehicle.

The rear camera display shall activate when the vehicle's transmission is placed in reverse.

CAMERA DISPLAY

The camera system shall display on the digital dash and a Weldon Vista display located on the officer's side dash. The camera system display can be activated through the digital dash control knob or through the Vista display panel.

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 chassis builder. 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 chassis builder supplied.

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.

CAB EXTERIOR PROTECTION

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

FIRE EXTINGUISHER

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

ROAD SAFETY KIT

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

DOOR KEYS

The cab and chassis shall include a total of four (4) door keys for the manual door locks.

DIAGNOSTIC SOFTWARE OCCUPANT PROTECTION

Diagnostic software for the Spartan Advanced Protection System shall be available for free download from the Spartan Chassis website to Spartan authorized OEMs, dealers and service centers, as well as the vehicle owner.

The software has been validated to be compatible with the following RP1210 interface adapters:

- Dearborn Group DPA4 Plus
- Noregon Systems JPRO® DLA+
- Cummins INLINE5
- Cummins INLINE6
- NexIQ™ USB-Link™

The software and adapter utilize the SAE J1939-13 heavy duty nine (9) pin connector which is located below the driver's side dash to the left of the steering column.

WARRANTY

Purchaser shall receive a Custom Chassis Two (2) Years or 36,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0102. The warranty certificate is incorporated by reference into this proposal and included with this proposal or available upon request.

CHASSIS OPERATION MANUAL

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

ENGINE AND TRANSMISSION OPERATION MANUALS

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

(1) Hard copy of the Engine Operation and Maintenance manual with digital copy

(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) digital copies of wiring schematics and option wiring diagrams.

APPARATUS INFORMATION LABEL

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

The label shall indicate the following specified information.

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

CAB TILT CONTROL

There shall be a cab tilt pendant control quick-connect coupler provided and installed on the right side of the apparatus. The pendant shall be located directly on the lower portion of the officer's side discharge panel

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

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

Six (6) Ziamatic UHH-1 Universal Helmet Holders shall be provided and shipped loose with the apparatus.

MUD FLAPS

Heavy-duty black rubber mud flaps with manufactures logo shall be provided behind the rear wheels. The mud flaps shall be bolted in place.

PUMP LOCATION

The pump shall be installed in a midship location behind the chassis cab, below the rear cab and speedlay overhang, forward of the body. When the cab is tilted, the pump is completely accessible. The side discharge panels, as described later, surrounding the pump discharge and intake ports shall be located ahead of the body compartments. The pump shall be accessed for rebuilding by either removal from the bottom of the frame or from the top of the frame to allow fast and simple service in various conditions.

PUMP MOUNTING

The pump assembly shall be mounted on angle brackets attached to the outside of the chassis frame rails. There shall be no structural framework surrounding the pump. The pump brackets shall use a three (3)-point mounting technique using a minimum of grade 5 hardware per the pump manufacturer's installation guidelines to allow chassis frame rails to flex independently without damage to the fire pump.

PUMP/PLUMBING WORK LIGHT

Two (2) 4" round LED work lights shall be installed on the underside of the speedlay compartment module to illuminate the internal piping and plumbing components.

The lights shall be activated by a switch on the control panel.

OPERATOR CONTROLS

The pump operators control station shall be completely enclosed and located in the forward area of the L-2 body compartment, to protect against road debris and weather elements.

The pump operator’s module shall be constructed of the same materials as the apparatus body and finish painted to match the compartment interior.

The controls shall be positioned at a height easily accessible from ground level and ergonomically efficient to provide user-friendly operation. The display shall accommodate all operational controls for maintaining and monitoring pump and engine system operations and foam controls (if applicable), for additional ease of operation and visibility. An access panel, equipped with mechanical fasteners, shall be provided for ease of removal and service.

VALVE CONTROL - ELECTRIC

Unless specified otherwise, all discharge valves shall be electrically controlled from the operators control panel. The valve operating mechanism will indicate the position of the valve at all times.

DISCHARGE PANEL LIGHTS

There shall be adequate illumination provided at the side discharge panels with the installation of two (2) 4" round LED lights recessed in the underside of the Speedlay compartment on each side of the apparatus.

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

PUMP SERVICE ACCESS

Ease of access to the pump and plumbing shall be provided at the front of the pump by raising the cab to allow service and maintenance. The pump shall be positioned such that maintenance and overhaul work can be performed above the frame, and under the tilted cab.

DISCHARGE PANEL WIDTH

The width of the pump discharge panel (front to back) shall be 41.00 inches (1.04 m).

SIDE DISCHARGE PUMP PANEL FINISH SSTL

The left and right side discharge panels shall be fabricated from 14 gauge “Brushed Stainless Steel” capable of withstanding the conditions and effects of extreme weather and temperature changes. The panels shall be easily removable with mechanical fasteners to provide a large access area to the pump for service.

The side discharge panels shall have items that include but are not limited to:

- Test Ports
- Warning Labels
- Data Plates

SOFT SUCTION HOSE STORAGE

There shall be a recessed cavity on the left side of the apparatus, integrated into the side discharge panel to store a roll of 25 feet of 5.00 inch suction hose. The cavity shall be located below the frame rail and be approximately 10.00 inches (254 mm) wide. The floor area shall have a light taper downward so assist in restraining the hose. Drain holes shall be provided in the rear corners.

There shall be two (2) Velcro strap type hold downs installed to secure the stored equipment in place during transit.

STORAGE CAVITY INTERIOR FINISH

The interior of the storage compartment shall feature a painted black Line-X finish.

LEFT SIDE SLIDE OUT PUMP OPERATOR'S PLATFORM

There shall be a pull-out Pump Operator's platform installed under the L2 body compartment. The platform shall be as wide as possible to fit the compartment and shall be approximately 16.00 inches (406.40 mm) deep when extended.

The platform shall lock into place while in the extended and stowed positions. The platform surface shall be constructed of "Aluminum Diamond Grip Strut" material covering the framework.

There shall be a reinforcement channel on the back of the step.

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

APPARATUS PLUMBING LABELING

Innovative Controls verbiage tag bezels shall be installed where applicable for components specified. The bezel assemblies will be used to identify apparatus components. These tags shall be designed and manufactured to withstand the specified apparatus service environment and shall be backed by a warranty equal to that of the exterior paint and finish. The verbiage tag bezel assemblies shall include a chrome-plated panel-mount bezel with durable easy-to-read UV

resistant polycarbonate inserts featuring the specified verbiage and color coding (if selected). These UV resistant polycarbonate verbiage and color inserts shall be subsurface screen printed to eliminate the possibility of wear and protect the inks from fading. Both the insert labels and bezel shall be backed with 3M permanent adhesive, which meets UL969 and NFPA standards.

BEZELS FOR DISCHARGES AND INLETS

Innovative Controls chrome finish die cast metal bezels shall be supplied around the openings in the pump panels for all discharge & auxiliary suction inlet fittings.

Chrome finish polycarbonate bezels shall be supplied around the openings for the main steamer inlets.

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, Standard for Automotive Fire Apparatus, 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 discharge panel. One shall be connected to the intake side of the pump, and the other to the discharge manifold side of the pump. They shall have 0.25 in. standard pipe thread connections and be manufactured of non-corrosive polished stainless steel or brass plugs.

TANK LEVEL GAUGE

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 20.00 foot 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.

AIR HORN SWITCH

There shall be a red rocker switch provided for air horn activation installed on the pump operator's gauge panel. The air horn switch shall be of weather resistance type and labeled “AIR HORN”.

MIDSHIP PUMP

The pump shall have a capacity of 2250 gallons per minute, measured in U.S. Gallons. The pump shall be a Waterous model CSU, 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 3.50 inch 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 inches 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, Standard for Automotive Fire Apparatus. Pump shall be free from objectionable pulsation and vibration.

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

100% of rated capacity at 150 PSI net pump pressure.
100% of rated capacity at 165 PSI net pump pressure.
70% or rated capacity at 200 PSI net pump pressure.
50% of rated capacity at 250 PSI net pump pressure.

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.

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.

EXTERNAL INTAKE VALVE

There shall be one (1) external valve with cap provided and installed on the steamer inlet by the Dealership.

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.

EXTERNAL INTAKE VALVE

There shall be one (1) external valve with cap provided and installed on the steamer inlet by the Dealership.

MASTER DRAIN VALVE

A Trident 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 draining. If no lower or vertical sill exists, 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 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 left side discharge 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.

FIRE PUMP PAINTED

The fire pump shall be painted as specified:

PLUMBING COLOR

The color shall be the same as the lower body color.

STAINLESS STEEL PLUMBING

All auxiliary suction and discharge plumbing related fittings, and manifolds shall be fabricated with schedule 40 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 1.50 inch through 4.00 inch. Sizes .75 inch, 1.00 inch and 5.00 inch 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 1.00 inch through 5.00 inch for maximum performance in tight bend applications. The material has a temperature rating of -40 degrees Fahrenheit to +210 degrees Fahrenheit.

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 inch and 1 inch 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

An Innovative Controls 3/4" quarter turn drain valve shall be included on each discharge, gated intake, and steamer valve (if applicable). A side stem, long stroke chrome plated lift handle shall be provided on the drain valve to facilitate use with a gloved hand. The drain valve shall have an ergonomically designed handle with a recessed verbiage tag area easily read by the operator before opening.

The drain valve shall be connected to the valve with a flexible hose that is routed in such a manner as to assure complete drainage to below the apparatus.

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 8000 series 'electric valve' with stainless steel ball.

STYLE 9333 VALVE CONTROLLER

The controller shall be an Akron Brass Style 9333 Navigator Pro™ 2.0 Valve Controller. The electric controls must be of true position feedback design, requiring no clutches in the motor or current limiting. The unit must be completely sealed with momentary open, close as well as an optional one touch full open feature to operate the actuator. Two additional buttons shall be available to be used for preset selection, preset activation and menu navigation.

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

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.

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 8000 series 'electric valve' with stainless steel ball.

STYLE 9333 VALVE CONTROLLER

The controller shall be an Akron Brass Style 9333 Navigator Pro™ 2.0 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 navigation. 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. The display shall be a full color LCD display with a backlight. It shall have manual adjustment of the brightness as well as an auto-dimming option. The unit must carry a five year warranty.

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

Each 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 DISCHARGE

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

DISCHARGE VALVE

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

STYLE 9335 NAVIGATOR PRO 2.0 VALVE CONTROLLER

The controller shall be an Akron Brass Style 9335 Navigator Pro™ 2.0 Valve Controller and shall be installed at the pump operator's panel location.

The electric controls must be of true position feedback design, requiring no clutches in the motor or current limiting. The unit must be completely sealed with momentary open, close as well as an optional one touch full open feature to operate the actuator. Three additional buttons shall be available to be used for preset selection, preset activation, CAFS activation (if provided), and menu activation.

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

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

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

DISCHARGE PLUMBING

The plumbing shall consist of 3.00 inch (77 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) 3.00 inch (77 mm) NST Straight adapter

One (1) 3.00 inch (77 mm) NST female by 4.00 inch (100 mm) Storz with 30 degree elbow

One (1) 4.00 inch (100 mm) Storz 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 8000 series 'electric valve' with stainless steel ball.

STYLE 9335 NAVIGATOR PRO 2.0 VALVE CONTROLLER

The controller shall be an Akron Brass Style 9335 Navigator Pro™ 2.0 Valve Controller and shall be installed at the pump operator's panel location. The electric controls must be of true position feedback design, requiring no clutches in the motor or current limiting. The unit must be

completely sealed with momentary open, close as well as an optional one touch full open feature to operate the actuator. Three additional buttons shall be available to be used for preset selection, preset activation, CAFS activation (if provided), and menu activation.

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

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

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

DISCHARGE PLUMBING

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

DISCHARGE TERMINATION

Each 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.

DISCHARGE VALVE

A 3.00 inch (77 mm) Akron Brass 8000 series 'electric valve' with a bronze flat ball and 4.00 inch (100 mm) discharge threads.

STYLE 9335 NAVIGATOR PRO 2.0 VALVE CONTROLLER

The controller shall be an Akron Brass Style 9335 Navigator Pro™ 2.0 Valve Controller and shall be installed at the pump operator's panel location. The electric controls must be of true position feedback design, requiring no clutches in the motor or current limiting. The unit must be completely sealed with momentary open, close as well as an optional one touch full open feature to operate the actuator. Three additional buttons shall be available to be used for preset selection, preset activation, CAFS activation (if provided), and menu activation.

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

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

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

DISCHARGE PLUMBING

The plumbing shall consist of 3.00 inch (77 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 by 5.00 inch (125 mm) Storz with 30 degree elbow

One (1) 5.00 inch (125 mm) Storz cap, secured by a chain

INTERNAL BODY SPEEDLAY MODULE

The apparatus body shall include the addition of a horizontal transverse speedlay compartment assembly approximately twenty-eight 28.00 inch (711.2 mm) front to back. This assembly shall be forward of the apparatus body, above the rearward portion of the water pump and the side discharge panels.

The speedlay compartment shall be constructed utilizing a combination of the same structural tubing and formed sheet metal as used on the structural body module. The structure shall be welded conforming to 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 speedlay compartment module. This assembly shall be and shall span the body transversely side to side.

The forward area of this compartment shall be recessed to accommodate the aerial travel rest with the speedlays (described elsewhere within these specifications) located to the rear.

The speedlay module shall be attached to the upper portion of the forward most body compartment using a minimum of grade 5 hardware and shall be separated from the apparatus cab 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 floors of the speedlay bays shall be removable to allow simple access to the plumbing manifolds for complete plumbing service and valve maintenance. Access to valves shall not require removal of operator panels or pump panels.

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

side.

Any exposed area of the assembly shall be finished to match the body configuration matching body job color paint and diamond plate surfaces where applicable.

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

ALUMINUM SPEEDLAY TRAYS

The three (3) removable speedlay trays shall be made of .188-inch aluminum material with a DA finish.

Each tray shall have vertical and horizontal hand holds for ease of handling. Slots shall be provided in the floor of the tray for hose drainage.

1 3/4" SPEEDLAY

A speedlay with the following specified components shall be provided for up to 200 feet (60 m) of 1.75 inch (44.4 mm) hose.

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

DISCHARGE VALVE

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

STYLE 9335 NAVIGATOR PRO 2.0 VALVE CONTROLLER

The controller shall be an Akron Brass Style 9335 Navigator Pro™ 2.0 Valve Controller and shall be installed at the pump operator's panel location. The electric controls must be of true position feedback design, requiring no clutches in the motor or current limiting. The unit must be completely sealed with momentary open, close as well as an optional one touch full open feature to operate the actuator. Three additional buttons shall be available to be used for preset selection, preset activation, CAFS activation (if provided), and menu activation.

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

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

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

DISCHARGE PLUMBING

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

DISCHARGE TERMINATION

Each discharge termination shall include the following components:

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

2 1/2" SPEEDLAY

A speedlay with the following specified components shall be provided for up to 200 feet (60 m) of 2.50 inch (63.5 mm) hose.

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

DISCHARGE VALVE

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

STYLE 9335 NAVIGATOR PRO 2.0 VALVE CONTROLLER

The controller shall be an Akron Brass Style 9335 Navigator Pro™ 2.0 Valve Controller and shall be installed at the pump operator's panel location.

The electric controls must be of true position feedback design, requiring no clutches in the motor or current limiting. The unit must be completely sealed with momentary open, close as well as an optional one touch full open feature to operate the actuator. Three additional buttons shall be available to be used for preset selection, preset activation, CAFS activation (if provided), and menu activation.

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

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

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

DISCHARGE PLUMBING

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

DISCHARGE TERMINATION

Each discharge termination shall include the following components:

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

SPEEDLAY DOORS

The speedlay compartment doors shall be roll-up style doors.

R·O·M ROLL-UP DOOR

A R•O•M Corporation Series IV roll-up shutter door shall be installed. Each shutter slat, track, bottom rail, and drip rail shall be constructed from anodized 6063 T6 aluminum.

Shutter slats shall feature a double wall extrusion 0.315 inches thick with a concave interior surface to minimize loose equipment jamming the shutter door closed. Shutter slats shall feature an interlocking end shoe to prevent side to side binding of the shutter door during operation. Slats must have interlocking joints with an inverted locking flange. Slat inner seal shall be a one piece PVC extrusion; seal design shall be such to prevent metal to metal contact while minimizing dirt and water from entering the compartment.

Shutter door track shall be one piece design with integral overlapping flange to provide a clean finished look without the need of caulk. Door track shall feature an extruded Santoprene rubber double lip low profile side seal with a silicone co-extruded back to reduce friction during shutter operation.

Shutter bottom rail shall be a one piece double wall extrusion with integrated finger pull. Finger pull shall be curved upward with a linear striated surface to improve operator grip while operating the shutter door. Bottom rail shall have a smooth contoured interior surface to prevent loose equipment from jamming the shutter door. Bottom rail seal shall be made from Santoprene; it will be a double “V” seal to prevent water and debris from entering compartment. Bottom rail lift bar shall be a one piece “D” shaped aluminum extrusion with linear striations to improve operator grip during operation. Lift bar shall have a wall thickness of 0.125 inches. Lift bar shall be supported by no less than two pivot blocks; pivot blocks shall be constructed from Type 66 Glass filled reinforced nylon for superior strength. Bottom rail end blocks shall have incorporated drain holes which will allow any moisture that collects inside the extrusion to drain out.

Shutter door shall have an enclosed counterbalance system. Counterbalance system shall be 4.00 inches in diameter and held in place by 2 heavy duty 18 gauge zinc plated plates. Counterbalance system shall have 2 over-molded rubber guide wheels to provide a smooth transition from vertical track to counterbalance system.

SIDE COMPARTMENT DOORS/TRACK/TRIM/WET PAINTED

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

ROLL-UP DOOR PROTECTORS

There shall be a protective cover installed under two (2) speedlay compartment door rolls to protect the door in the rolled up position.

ROLL-UP DOOR PROTECTOR FINISH

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

DOOR ASSIST STRAPS

There shall be nylon straps installed on both the left and right side 'Speedlay' compartment doors to assist in closing the door.

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 parking brake is released, it shall activate the “hazard light” in the cab to alert the crew.

SPEEDLAY COMPARTMENT LIGHTING

Interior lighting shall be provided as specified below in each of the Speedlay compartments.

Two (2) ROM LED strip lights shall be installed in two (2) mid height compartment(s).

FRONT BUMPER DISCHARGE OUTLET

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

DISCHARGE VALVE

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

STYLE 9335 NAVIGATOR PRO 2.0 VALVE CONTROLLER

The controller shall be an Akron Brass Style 9335 Navigator Pro™ 2.0 Valve Controller and shall be installed at the pump operator's panel location. The electric controls must be of true position feedback design, requiring no clutches in the motor or current limiting. The unit must be completely sealed with momentary open, close as well as an optional one touch full open feature to operate the actuator. Three additional buttons shall be available to be used for preset selection, preset activation, CAFS activation (if provided), and menu activation.

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

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

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

DISCHARGE PLUMBING

The plumbing shall consist of 2.00 inch (50 mm) piping and 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

Each discharge termination shall include the following components:

One (1) 2.00 inch (50 mm) NPT x 1.50 inch (38 mm) NST, polished stainless steel chicksan swivel

FRONT BUMPER DISCHARGE LOCATION

The front bumper discharge shall be mounted on top of the gravel shield of the front bumper extension. The discharge shall be placed outboard of the frame rail extensions on the left side.

The discharge shall terminate with a chicksan swivel to accommodate deployment of hose in different directions.

AERIAL FEED /PUMP - REAR INLET

There shall be an aerial feed waterway provided and installed on the apparatus.

The aerial waterway feed shall be supplied from the discharge valve on the water pump and by the auxiliary rear inlet. The rear inlet shall be installed in a recessed stainless steel inlet box located on the lower rear of the apparatus, centered.

One (1) Tecniq model #E03-W000 series hooded light shall be installed to illuminate the inlet.

The following specified components shall be provided:

DISCHARGE VALVE

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

STYLE 9335 NAVIGATOR PRO 2.0 VALVE CONTROLLER

The controller shall be an Akron Brass Style 9335 Navigator Pro™ 2.0 Valve Controller and shall be installed at the pump operator's panel location. The electric controller must be of true position feedback design, requiring no clutches in the motor or current limiting. The unit must be completely sealed with momentary open, close as well as an optional one touch full open feature to operate the actuator. Three additional buttons shall be available to be used for preset selection, preset activation, CAFS activation (if provided), and menu activation.

The unit must be capable of being connected to a Flow Sensor or Pressure Sensor and provide an LCD display showing pressure and flow as well as valve position indication.

Valve position indication must be determined from true position feedback and indicate the exact position of the valve.

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

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

AERIAL PLUMBING

The aerial feed shall be plumbed from the discharge valve on the pump, located on the center 8-bolt flange, to the base of the aerial turntable. A 'tee' connection shall be provided below the turntable to extend the piping to the rear of the apparatus so that it may serve as a rear discharge or an aerial feed port at the rear of the apparatus. The plumbing shall be drained with a 1.50 inch (38 mm) drain valve system.

AERIAL INLET TERMINATION

The aerial waterway inlet shall include the following components:

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 cap, secured by a chain

AERIAL FEED GAUGE

One (1) gauge shall be installed at the aerial inlet for reading inlet pressure.

The gauge(s) shall be Innovative Controls Inc., 2.50 inch (65 mm), unless otherwise specified.

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.

LED BACKLIT GAUGE(S)

One (1) gauge(s) shall be LED backlit, Red.

BEZEL FOR 2.5" PRESSURE GAUGE

There shall be a chrome finish, die cast metal bezel around the 2.50 inch (65 mm) Aerial Inlet and/or aerial discharge pressure gauge(s) as specified. The bezel shall be equipped with an easily identifiable recessed label for color-coding for the gauge and color-coding and verbiage on the handle.

There shall be a total of one (1).

TANK TO PUMP LINE

The connection between the tank and the pump shall be capable of the flow recommendations as set forth in (NFPA) 1901, Standard for Automotive Fire Apparatus, 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. Three (3) inch SSTL piping shall be used to complete the connection from the tank to pump valve to the water tank.

TANK TO PUMP CHECK VALVE

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

TANK TO PUMP VALVE

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

STYLE 9333 VALVE CONTROLLER

The controller shall be an Akron Brass Style 9333 Navigator Pro™ 2.0 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 navigation. 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. The display shall be a full color LCD display with a backlight. It shall have manual adjustment of the brightness as well as an auto-dimming option. The unit must carry a five year warranty.

TANK FILL LINE

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

TANK FILL VALVE

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

STYLE 9333 VALVE CONTROLLER

The controller shall be an Akron Brass Style 9333 Navigator Pro™ 2.0 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 navigation. 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. The display shall be a full color LCD display with a backlight. It shall have manual adjustment of the brightness as well as an auto-dimming option. The unit must carry a five year warranty.

FORMED ALUMINUM BODY

The apparatus body shall be a formed aluminum design, which serves as the structural skeleton to support the body and its contents. The entire formed structure shall be welded together utilizing an A.W.S. Certified welding procedure.

BODY STRUCTURE MEMBERS

The body shall have structural members in certain areas of the body. 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 and .188 inch (4.78 mm) sheet materials shall be Aluminum Alloy 5052-H32. These alloys are required because it provides optimum all-around performance for strength, manufacturing properties, and corrosion resistance.

ECK® ANTI-CORROSION PROCESS

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

FRONT BODY COMPARTMENT WALLS

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

REAR BODY COMPARTMENT WALLS

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

BODY COMPARTMENT ACCESS PANELS

Removable panels shall be provided in the apparatus body, where needed, to access shut off valves and connection points within the hydraulic system.

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 or a roll up type door as specified.

COMPARTMENT LOAD CAPACITY

Each compartment shall have a minimum of one additional structural compartment floor support centered on the underside of the compartment floor. This additional member shall be integral with the body. Each compartment must be designed 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

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.

FASTENERS

All bolts and nuts used in the finish construction of the apparatus shall be stainless steel. 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.

PAINT SPECIFICATIONS

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

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

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

The paint applied to the apparatus shall be AkzoNobel, Sikkens brand, LVBT650 basecoat, 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 FLNA 32525 Red to match PPG 910853.

LINE-X COMPARTMENT FINISH

The compartment interiors shall be coated with Line-X.

COMPARTMENT FINISH COLOR

The Line-X Color shall be Medium Gray.

UNDERCOATING

The underside of the apparatus body shall be cleaned and prepared for the application of a sprayed on automotive type undercoating for added corrosion resistance.

The undercoating is to be of a quick dry rubberized, solvent based coating that is (black) in color. Resists rust and abrasion as it seals out dust and moisture.

The application does not include any additional underbody components.

FRONT AND REAR OVERLAYS

The lower front face of the apparatus body shall have overlay panels installed to match those provided on the adjacent pump discharge panels.

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.

CATWALKS

The catwalks shall be constructed with materials of a non-slip .125 inch embossed aluminum diamond plate.

BODY ROOF COVER

The roof of the body shall be overlaid with materials of an embossed aluminum diamond plate.

AERIAL BODY MOUNTING SYSTEM

The complete apparatus body shall be modular in construction and built separately from the chassis. The apparatus body shall be mounted to the chassis framework. The body shall be combination bolted and welded to hangers to reduce fatigue of the body material in mounting locations.

Rubber isolators, of a specific durometer to carry the necessary loads of the apparatus body, shall be provided at various points where needed to help reduce vibration and minimize the stress absorbed by the body caused from chassis frame rail flexing.

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 98" excluding any attached peripherals such as rub rails, fenderettes, grab handles, etc.

COMPARTMENT DRAINS

Two (2) .50" diameter drain holes shall be provided in all exterior apparatus compartments. Drains shall be protected from dust, dirt, and moisture by the stiffener channel on the underside of the compartment.

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. Louvered plate vents shall be installed appropriately on the compartment interior walls.

COMPARTMENTATION

The following compartments shall be supplied on the apparatus:

Compartment "L1"

There shall be one (1) compartment located above the forward outriggers on the left side of the apparatus.

The approximate interior dimensions of this compartment shall be 23.50" wide x 21.25" high with a depth of 24.75".

The framed opening shall measure approximately 23.50" wide x 19.50" high.

This compartment shall have a painted lift up hinged door with a D ring handle latch and gas shock hold open device. A single TecNiq LED light shall be installed in the ceiling of this compartment.

Compartment "L2"

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 36.75" wide by 70.75" high with a depth of 24.75".

The framed opening shall measure approximately 36.50" wide by 67.25" high.

Compartment "L3"

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

The approximate interior dimensions of this compartment shall be 55.00" wide by 40.50" high with a depth of 24.75”.

The framed opening shall measure approximately 55.25" wide by 37.25" high.

Compartment "L4"

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

The approximate interior dimensions of this compartment shall be 55.50" wide by 32.25" high with a depth of 24.00”.

The framed opening shall measure approximately 55.25" wide by 29.00" high.

Compartment "L5"

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

The approximate interior dimensions of this compartment shall be 44.25" wide by 59.25" high with a depth of 24.00".

The framed opening shall measure approximately 44.00" wide by 59.00" high.

Compartment "R1"

There shall be one (1) compartment located above the forward outriggers on the right side of the apparatus.

The approximate interior dimensions of this compartment shall be 23.50" wide x 21.25" high with a depth of 24.75".

The framed opening shall measure approximately 23.50" wide x 19.50" high.

This compartment shall have a painted lift up hinged door with a D ring handle latch and gas shock hold open device. A single TecNiq LED light shall be installed in the ceiling of this compartment.

Compartment "R2"

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

The approximate interior dimensions of this compartment shall be 36.75" wide by 70.75" high with a depth of 24.75".

The framed opening shall measure approximately 36.50" wide by 67.25" high.

Compartment "R3"

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

The approximate interior dimensions of this compartment shall be 55.00" wide by 40.50" high with a depth of 24.75".

The framed opening shall measure approximately 55.25" wide by 37.25" high.

Compartment "R4"

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

The approximate interior dimensions of this compartment shall be 44.25" wide by 30.00" high with a depth of 24.00".

The framed opening shall measure approximately 44.00" wide by 25.50" high.

ROLL-UP DOOR CONSTRUCTION

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

R·O·M ROLL-UP DOOR

A R•O•M Corporation Series IV roll-up shutter door shall be installed. Each shutter slat, track, bottom rail, and drip rail shall be constructed from anodized 6063 T6 aluminum.

Shutter slats shall feature a double wall extrusion 0.315 inches thick with a concave interior surface to minimize loose equipment jamming the shutter door closed. Shutter slats shall feature an interlocking end shoe to prevent side to side binding of the shutter door during operation. Slats must have interlocking joints with an inverted locking flange. Slat inner seal shall be a one piece PVC extrusion; seal design shall be such to prevent metal to metal contact while minimizing dirt and water from entering the compartment.

Shutter door track shall be one piece design with integral overlapping flange to provide a clean finished look without the need of caulk. Door track shall feature an extruded Santoprene rubber double lip low profile side seal with a silicone co-extruded back to reduce friction during shutter operation.

Shutter bottom rail shall be a one piece double wall extrusion with integrated finger pull. Finger pull shall be curved upward with a linear striated surface to improve operator grip while operating the shutter door. Bottom rail shall have a smooth contoured interior surface to prevent loose equipment from jamming the shutter door. Bottom rail seal shall be made from Santoprene; it will be a double “V” seal to prevent water and debris from entering compartment. Bottom rail lift bar shall be a one piece “D” shaped aluminum extrusion with linear striations to improve operator grip during operation. Lift bar shall have a wall thickness of 0.125 inches. Lift bar shall be supported by no less than two pivot blocks; pivot blocks shall be constructed from Type 66 Glass filled reinforced nylon for superior strength. Bottom rail end blocks shall have incorporated drain holes which will allow any moisture that collects inside the extrusion to drain out.

Shutter door shall have an enclosed counterbalance system. Counterbalance system shall be 4.00 inches in diameter and held in place by 2 heavy duty 18 gauge zinc plated plates. Counterbalance system shall have 2 over-molded rubber guide wheels to provide a smooth transition from vertical track to counterbalance system.

SIDE COMPARTMENT DOORS/TRACK/TRIM/WET PAINTED

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

ROLL-UP DOOR PROTECTORS

There shall be a protective cover installed under Seven (7) body side compartment door roll(s) to protect the door in the rolled up position.

ROLL-UP DOOR PROTECTOR FINISH

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

DOOR OPEN INDICATOR

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

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

HINGED DOOR CONSTRUCTION

The compartment doors above the front outriggers shall be flat overlap, double seal style with double panel construction. Outer door panel shall be 3/16" aluminum with an inner door panel of 1/8" aluminum. Compartment door seals shall be closed cell rubber, attached to the perimeter of the door to seal to the surface of the body and attached to the inner door flange to seal the inner pan of the door.

Compartment door latches shall be Eberhard #206 with Hansen stainless steel bent "D" ring outer latch assembly. The compartment door latches shall be dual catch slam action type. The second door of a double door compartment shall have an internal slam-action latch.

Automatic, gas-filled cylinder type, door stay arms shall be provided - two (2) per horizontally hinged door. The stay arms shall cushion door movement.

Compartment door hinges shall be full-length polished stainless steel piano type with 1/4" stainless steel pin. Hinges shall be bolted to the body and to the doors.

DOOR ASSIST STRAPS

There shall be nylon straps installed on Two (2) compartment doors to assist in closing the door.

DOOR OPEN INDICATOR

Two (2) body compartment hinged doors shall be provided with an auto door switch. The switch shall be installed on the primary compartment door and activate the open door indicator when the door is opened.

The switch shall be of a magnetic style reed indicator type. Each switch shall be hermetically sealed rated to 10,000,000 cycles. 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 driver.

REAR SUPPLEMENTAL STORAGE COMPARTMENT

A supplemental storage compartment shall be provided on the rear vertical face of the apparatus on the driver's side. The compartment shall be as large as is practical within the space available.

The compartment shall be provided with a vertically hinged door constructed from the same material as the rear body overlay. The door shall be provided with a Hansen stainless steel bent "D" ring outer latch assembly with single quarter turn latch assembly. The door shall be connected to the "Door Open" circuit in the cab.

A single TecNiq LED light shall be installed in the ceiling of this compartment.

SILL PLATES

Mirrored stainless steel sill plates shall be installed at the bottom of Nine (9) body compartment door openings as specified.

ROM COMPARTMENT STRIP LIGHTING

ROM 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) ROM LED strip lights shall be installed in three (3) over wheel compartment(s).
Two (2) ROM LED strip lights shall be installed in one (1) low side compartment(s).
Two (2) ROM LED strip lights shall be installed in two (2) full height compartment(s).
Two (2) ROM LED strip lights shall be installed in the rear ladder compartment.

FLUSH FLAT BACK

The rear of the apparatus shall be equipped with a flush back construction with no tailboard extension.

The rear 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, Standard for Automotive Fire Apparatus.

WHEEL WELLS

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

WHEEL WELL PANELS

The body panel in the wheel well area on each side of the body shall be fabricated of same material type as the body and finish painted.

SCBA BOTTLE COMPARTMENTS

Cylindrical SCBA storage compartments shall be installed in the wheel well area above the wheel well liner, protected from dirt, rocks, and other debris.

The storage compartments shall be made of a tube that interfaces with a door and housing - fastened to the wheel well panel for a secure installation. The inside of each compartment shall be lined with material (if required) to protect the air bottles from being damaged.

The storage compartments shall be installed in the apparatus at an inclined angle and incorporate a 1" nylon safety loop to be attached to the top of the bottle, to prevent the bottles from sliding forward when stored. There shall be holes drilled in the tubes for drainage in the event that water enters the compartment. Each SCBA compartment shall be a minimum internal diameter of 7.5" and be at least 25" deep.

There shall be storage provided for three (3) bottles on the driver's side of the apparatus with one forward and two (2) between the tandem axle wheel wells. There shall be storage provided for four (4) bottles on the officer's side of the apparatus with one forward and one rearward and two (2) between the tandem axle wheel wells.

A polished finish stainless steel door with a push button latch shall be provided for each location.

FUEL FILL ASSEMBLY

There shall be a fuel fill assembly located on the driver's side rear wheel well panel accessing the chassis supplied fuel tank. The assembly shall be located in the area rearward of the axle that best suits efficient fuel filling with the space appropriated on the left side of the apparatus.

The fuel fill assembly will have a drain to allow overflow to drain on the back side of the apparatus body. The fuel fill cap shall be removable, manufactured of plastic materials, green in color.

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

Each fuel fill compartment shall be provided with a polished finish stainless steel door with a magnetic latch.

FENDERETTES

Four (4) polished stainless steel fenderettes shall be provided on body rear wheel well openings, two (2) each side. A 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.

RIGHT SIDE EZ HOSE LOAD

There shall be one (1) hose bed area provided on the apparatus on the right side of the aerial turntable area. The hose bed shall be capable of holding 1000 feet of 5 inch hose in a flat lay. Access shall be from the rear of the apparatus for ease of deployment.

VINYL COATED NYLON HOSE BED COVER

A hose bed cover constructed of vinyl coated nylon material shall be provided and installed on the apparatus.

The cover shall be held in place by extruded aluminum channel on the front and an elastic shock cord sewn into the tarp with brass grommets where the shock cord passes through the hose bed cover on the sides. Hooks shall be provided on the sides to provide a means of attaching the cover to the apparatus. The hooks shall be made of cast aluminum.

HOSE BED COVER COLOR

The hose bed cover shall be red in color.

REAR HOSEBED RESTRAINT

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

THE COVER WILL BE HELD IN PLACE BY AN EXTRUDED ALUMINUM CHANNEL AT THE TOP.

REAR FLAP COLOR

The rear flap shall be red.

HOSE BED LIGHT

There shall be one (1) 4.00 inch round LED light provided to illuminate the hose bed.

The light shall be recess mounted in the upper forward wall of the hose bed area.

HOSE BED LIGHT ACTIVATION

The hose bed light shall be activated when the park brake is set.

TANK CAPACITY

The tank shall be 500 gallons (1893 liters) in capacity.

UPF POLY TANK III

The booster tank shall be constructed of PT3™ polypropylene material. This material shall be a non-corrosive stress relieved thermoplastic and UV stabilized for maximum protection. The booster and/or foam tank shall be of a specific configuration and is so designed to be completely independent of the body and compartments.

All joints and seams shall be fused using nitrogen gas as required and tested for maximum strength and integrity. The tank construction shall include PolyProSeal™ technology wherein a sealant shall be installed between the plastic components prior to being fusion welded. This sealing method will provide a liquid barrier offering leak protection in the event of a weld compromise. The top of the booster tank is fitted with removable lifting assembly designed to facilitate tank removal. The transverse and longitudinal swash partitions shall be manufactured of a minimum of 3/8" PT3™ polypropylene. All partitions shall be equipped with vent and air holes to permit movement of air and water between compartments. The partitions shall be designed to provide maximum water flow. All swash partitions interlock with one another and are completely fused to each other as well as to the walls of the tank. All partitions and spacing shall comply with (NFPA) 1901, Standard for Automotive Fire Apparatus. The walls shall be welded to the floor of

the tank providing maximum strength as part of the tank's unique Full Floor Design™. Tolerances in design allow for a maximum variation of .125 on all dimensions.

WATER FILL TOWER AND COVER

The tank shall have a combination vent and manual fill tower. The fill tower shall be constructed of .50 inch (12.7 mm) PT3™ polypropylene. The fill tower shall be blue in color indicating that it is a water-only fill tower. The tower shall be located in the best suitable location. This is usually in the right front corner of the tank unless an alternate location is required. The tower shall have a .25 inch (6.4 mm) thick removable polypropylene screen and a PT3™

Polypropylene hinged cover. The capacity of the tank shall be engraved on the top of the fill tower lid. Inside the fill tower there shall be a combination vent/overflow pipe. The vent overflow shall be a minimum of schedule 40 polypropylene pipe with a minimum

I. D. of 4.00 inch (100 mm) that is designed to run through the tank and shall be piped to discharge water behind the rear wheels as required in (NFPA) 1901, Standard for Automotive Fire Apparatus, so as to not interfere with rear tire traction.

The tank cover shall be constructed of .50 inch (12.7 mm) thick PT3™ polypropylene and UV stabilized, to incorporate a multi-piece locking design, which allows for individual removal and inspection if necessary. The tank cover(s) shall be flush or recessed 3/8" from the top of the tank and shall be fused to the tank walls and longitudinal partitions for maximum integrity. Each one of the covers shall have hold downs consisting of 2.00 inch (50 mm) minimum polypropylene dowels spaced a maximum of 40.00 inch (1016 mm) apart. These dowels shall extend through the covers and will assist in keeping the covers rigid under fast filling conditions. A minimum of two lifting dowels shall accommodate the necessary lifting hardware.

MOUNTING

The UPF Poly-Tank® III shall rest on the body cross members in conjunction with such additional cross members, spaced at a distance that would not allow for more than 530 square inches of unsupported area under the tank floor. In cases where overall height of the tank exceeds 40.00 inch (1016 mm), cross member spacing must be decreased to allow for not more than 400 square inches of unsupported area. The tank must be isolated from the cross members through the use of hard rubber strips with a minimum thickness and width dimension of .25 inch (6.4 mm) x 1.00 inch (25 mm) and a "Shore A" scale hardness of approximately 60 durometer. The rubber must be installed so it will not become dislodged during normal operation of the vehicle. Additionally, the tank must be supported around the entire bottom outside perimeter and captured both in the front and rear as well as side to side to prevent tank from shifting during vehicle operation.

A picture frame type cradle mount with a minimum of 2.00 inch (50 mm) x 2.00 inch (50 mm) x .25 inch (6.4 mm) mild steel, stainless steel, or aluminum angle shall be provided or the use of corner angles having a minimum dimension of 4.00 inch (100 mm) x 4.00 inch (100 mm) x 4.00 inch (100 mm) by 6.00 inch (150 mm) high are permitted for the purpose of capturing the tank.

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

If proper retention has not been incorporated into the apparatus hose floor structure, an optional mounting restraint system shall be located on top of the tank, halfway between the front and the rear on each side of the tank. These stops can be constructed of steel, stainless steel or aluminum angle having minimum dimensions of 3.00 inch (77 mm) x 3.00 inch (77 mm) x .25 inch (6.4 mm) and shall be approximately 6.00 inch (150 mm) to 12.00 inch (304.80 mm) long. These brackets must incorporate rubber isolating pads with a minimum thickness of .25 inch and a hardness of 60 durometer affixed on the underside of the angle. The angle should then be bolted to the body side walls of the vehicle while extending down to rest on the top outside edge of the upper side wall of the tank. Hose beds floors must be so designed that the floor slat supports extend full width from side wall to side wall and are not permitted to drop off the edge of the tank or in any way come in contact with the individual covers where a puncture could occur. Tank top must be capable of supporting loads up to 200 lbs. per sq. foot when evenly distributed. Other equipment such as generators, portable pumps, etc. must not be mounted directly to the tank top unless provisions have been designed into the Poly-Tank® III for that purpose. The tank shall be completely removable without disturbing or dismantling the apparatus structure. The tank must be designed and fabricated by a tank manufacturer that is ISO 9001:2008 certified. The ISO certification must be to the current standard in effect at the time of the design and fabrication of the tank.

TANKNOLOGY™ TAG

A tag shall be installed on the apparatus in a convenient location and contain pertinent information including a QR code readable by commercially available smart phones. The information contained on the tag shall include the capacity of the water and foam(s), the maximum fill and pressure rates, the serial number of the tank, the date of manufacture, the tank manufacturer, and contact information. The QR code will allow the user to connect with the tank manufacturer for additional information and assistance.

FILL TOWER

The fill opening shall be approximately 10.00 inches (254.00 mm) x 10.00 inches (254.00 mm). The tower will have a .25 inch (6.40 mm) thick removable polyprene screen and a polyprene 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 polyprene screen to prevent debris from falling into the tank.

The fill tower shall have a 3.00 inch (75.00 mm) overflow that will discharge from the rear of the tank to the ground behind the rear wheels. The overflow shall terminate above the tank water level when filled to the rated capacity.

TANK CLEANOUT

There shall be a 3.00 inch (77 mm) plug located at the front of the tank for use in draining and cleaning out the tank.

OUTLETS

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

REAR CENTER LADDER STORAGE AREA

There shall be a rear center storage area constructed for ladder storage. The ladder storage area shall utilize the area enclosed by the torque box of the aerial device. The ladder storage area shall be constructed as large as possible within the confines of the torque box area.

The ladder storage area shall be used to store ground ladders on edge. The area shall be divided to allow removal of any such ladder without disturbing the storage of any other. The ladders shall be stored on slides to separate the ladders from each other. The lower slides shall be fabricated of extruded polyester structural angles for low friction and prevention of damage to ground ladder rails. The upper slides shall be fabricated of formed aluminum laminated with polypropylene wear pads to hold the ladders in alignment and prevent metal to metal contact between the ladders and slides. The ladder slides shall be bolted in place for easy removal.

Ladder stops shall be provided at the front of the ladder slides to prevent the ladders from sliding forward. A hinged ladder stop shall be provided at the rear to prevent the ladders from sliding rearward and fouling the roll-up door.

Storage for up to six (6) standard hook type pike poles shall be provided in the rear ground ladder storage area, unless otherwise noted. Each pike pole shall be stored in an individual, properly labeled, 2.25" diameter aluminum tube.

The ladder storage area shall also be utilized for storage of any other miscellaneous equipment as available space allows.

A roll-up door shall be provided over the rear ladder storage area to provide access to the storage area and prevent dirt and road grime from drafting into the area.

REAR LADDER DOOR FINISH

The rear ladder compartment door shall be satin aluminum finish.

GROUND LADDERS

The following ground ladders shall be provided:

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

Two (2) Duo-Safety 35 foot (10.0 m) two (2) section aluminum extension ladder(s), model 1200.

One (1) Duo-Safety 14 foot (4.0 m) aluminum roof ladder(s) with folding hooks and pronged feet on both ends, model 775DR.

One (1) Duo-Safety 16 foot (5.0 m) aluminum roof ladder(s) with folding hooks and pronged feet on both ends, model 875DR.

One (1) Duo-Safety 20 foot (6.0 m) aluminum roof ladder(s) with folding hooks and pronged feet on both ends, model 875DR.

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

One (1) Duo-Safety 14 foot (4.0 m) aluminum 2-section Fresno ladder(s), model 701-A.

FIRE HOOKS UNLIMITED PIKE POLES

- one (1) Fire Hooks Unlimited 12 foot (3.6 m) solid white ash National Hook(s), model NH-12.

- one (1) Fire Hooks Unlimited 8 foot (2.4 m) solid white ash National Hook(s), model NH-8.

- two (2) Fire Hooks Unlimited 6 foot (1.8 m) solid white ash National Hook(s), model NH-6.

OUTRIGGER ACCESSORIES

The outriggers shall be controlled from the rear of the apparatus. A control box with a hinged door shall be provided and installed, one (1) each side, installed per NFPA, lighted for night operations. There will be a side to side indicator provided and installed at the rear of the apparatus to aid in leveling the unit.

The outrigger control doors shall be fabricated from Mirror finish stainless steel.

AUXILLARY GROUND PAD STORAGE HOLDERS

Two (2) drop-in type auxiliary ground pad storage holders shall be provided. Each holder assembly shall be designed to hold a two (2) auxiliary ground pads. The storage holders shall be located under the apparatus, as close to the rear outrigger/stabilizer as design allows.

The holders shall be fabricated of aluminum.

OUTRIGGER COVERS

Mirrored stainless steel covers shall be installed over the outrigger areas on each side of the apparatus, front and rear. Each active cover shall mount directly to the outrigger stabilizer arm and extend with the outrigger.

TURNTABLE ACCESS CORNER STEPS

A "Corner Step" access step arrangement shall be provided and installed at each rear corner of the apparatus for access to the turntable.

The access steps shall be located rearward of the side body compartments. The step treads shall be constructed of 3/16" aluminum diamond plate with a slip resistant aluminum open grating type stepping material insert.

The steps shall be permanently secured to the body with mechanical fasteners. Five (5) stationary steps with a single fold down step at the bottom shall be provided on each side of the apparatus. When deployed, the fold-down step shall create a safe and comfortable climbing angle.

The steps shall utilize as much of the available space in the rear body corner recessed areas and be as large as is practical. The steps shall be arranged with equal height between and shall be sized to provide an inclined climbing angle.

A mechanical locking mechanism shall be provided to retain each fold down step in a stowed and secured position when in transit or when not in use. Access step illumination shall be provided during low light conditions.

If the step 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.

HANDRAILS KNURLED SST

All handrails shall be 1.25 inches in diameter, constructed of knurled #3 polished stainless steel tubing. There shall be a 2.00 inch minimum clearance between the bracket and the body. The handrails shall be spaced away from the body using chrome plated ends.

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

REAR HANDRAIL LOCATION

Two (2) sets of handrails shall be provided and installed at the rear of the apparatus, one (1) handrail on each side of the access steps. Each handrail shall be of an adequate length, as available usable space allows, to provide a suitable gripping area for personnel.

STEP LIGHTING

Eight (8) Tecniq model #E03-W000 series hooded step light(s) shall be installed to illuminate the stepping surfaces.

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

UNDER ACCESS STEP LIGHTING

One (1) light shall be installed to illuminate the ground beneath each of the access step areas specified. The light shall be a TecNiq model T44 series, 4" round, 8 diode LED light.

The light shall be directed beneath and positioned below the access step area.

LIGHTING ACTIVATION

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

SIDE COMPARTMENT UNISTRUT

Vertically mounted Unistrut shall be installed in all apparatus body compartments not located above the outriggers, in the upper and lower sections, to accommodate the installation of shelves, trays, and or other miscellaneous equipment.

COMPARTMENT FLOOR MATTING

Turtle Tile floor tiles shall be installed on the floor of all exterior compartments. The tile shall be custom fitted to the interior compartment floor construction to protect the entire floor surface from equipment damage.

FLOOR MATTING COLOR

The floor matting shall be black in color.

FLOOR EDGING

Tapered floor tile shall be installed along the compartment floor edges with floor matting. The beveled tile shall be custom fitted to the matting installed and the interior compartment construction. The tapered tile shall aid in the removal and installation of equipment while protecting the compartment floor edge from equipment damage.

FLOOR EDGING COLOR

The tapered edges shall be black.

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

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

RUB RAIL RETRO-FLECTIVE STRIPING

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

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

TOW EYES

There shall be two (2) tow eyes installed on the rear of the apparatus, one (1) each side. The tow eyes shall be connected directly to the torque box and extend down below the apparatus body. The tow eyes are to have an inside diameter of approximately 3.00 inches and shall be painted to match the torque box.

LOW-VOLTAGE ELECTRICAL SYSTEM (MULTIPLEX)

Common power distribution areas shall be located at various points on the body and pump area (if applicable). These power distribution areas shall include the multiplexing input/output modules. Additional electrical components in these areas may include, but not be limited to, common power and ground studs, ground busses, solenoids, terminal strips, relays, and circuit breakers. All circuits shall have some form of circuit overcurrent protection either internal to the multiplexing device or external in the form of fuses or circuit breakers.

Wiring shall conform to section 13.2 of NFPA 2016, including wire type, identification, and rating; sizing for voltage drop and current load; and connections and terminations. Wiring protection shall include loom and braid and also meet section 13.2 of NFPA 2016, including temperature and moisture protection. Connections shall be made using Deutsch connectors, Packard connectors, ring terminals, and terminal lugs, as well as other accepted practices. The body and pump compartment (if applicable) shall be bonded to the vehicle frame.

VISTA SCREEN LAYOUT APPROVAL

Vista screen layouts shall be provided prior to manufacturing for fire department approval.

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) each side under the front body compartments, one (1) each side under the rear body compartments, and two (2) under the rear of the apparatus.

PERIMETER LIGHTS

The underbody perimeter lights provided will be TecNiq model T44 series, 4" round, 8 diode LED lights.

PERIMETER LIGHTS ACTIVATION

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

UPPER LIGHTING PACKAGE

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

UPPER ZONE C:

There shall be two (2) Whelen model L31HRFN series red beacons with 360 degree LED lights, provided and installed on the apparatus, one (1) each side on the rear upper outboard corners.

The upper ZONE C specified lights shall be mounted directly to the horizontal body surface as far rearward as possible.

UPPER REAR WARNING LIGHT SWITCH E-MASTER/VISTA

The upper rear warning lights shall be controlled through the master warning switch and a secondary rear warning switch located on the Vista display control screen. The switches shall be clearly labeled for ease of identification.

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 M6V2 series LED lights with chrome bezels provided and installed on the apparatus. The lights shall be configured with an M6 V series LED warning light in the upper section and an LED "Perimeter" light in the lower section. Perimeter light shall be activated with the application of the parking brake.

SIDE WARNING LIGHTS FLASH

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

SIDE WARNING LIGHTS COLOR

The lower side warning lights mounted on the side positions shall be red with clear lenses in both the upper warning light and in the lower perimeter light section.

SIDE WARNING LIGHTS LOCATION

The warning lights on the side of the apparatus shall be mounted, one (1) on each active outrigger panel.

LOWER SIDE WARNING LIGHT SWITCH E-MASTER/VISTA

The lower side warning lights shall be controlled through the master warning switch and a secondary side warning switch located on the Vista display control screen. The switches shall be clearly labeled for ease of identification.

LOWER ZONE C:

There shall be two (2) Whelen model M6 series Super-LED lights provided and installed on the rear of the body.

REAR WARNING LIGHTS FLASH

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

REAR WARNING LIGHTS COLOR

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

MOUNTING FLANGES

There shall be individual mounting flanges provided for "Lower Level Zone C" warning lights mounted above the taillight assembly. The light bezel(s) shall be provided with a chrome finish.

LOWER REAR WARNING LIGHT SWITCH E-MASTER/VISTA

The lower rear warning lights shall be controlled through the master warning switch and a secondary rear warning switch located on the Vista display control screen. The switches shall be

clearly labeled for ease of identification.

LED REAR TAILLIGHT ASSEMBLY

There shall be Whelen M6-Series Super LED rear taillight assemblies provided and installed with the apparatus, one (1) each side at the rear.

The following shall be installed:

One (1) #M6BTT LED red brake light
One (1) #M6T LED series amber turn signal light
One (1) #M6 BUW LED clear backup light

REAR DOT LIGHTS COLOR

The rear DOT lights (Stop, Tail, Turn) shall be provided with colored lenses appropriate to their function.

MOUNTING FLANGES

There shall be individual mounting flanges provided for each light of the taillight assembly.

The light bezel(s) shall be provided with a chrome finish.

BACKUP LIGHTS

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

LED DOT LIGHTING

There shall be seven (7) lights located on the rear of the apparatus. Three (3) of the lights shall be mounted on the rear of the apparatus center location of the tailboard, for use as identification lamps. Two (2) lights and red reflectors shall be located on the lower rear of the apparatus in the outboard locations.

Two (2) additional lights shall be located on the rear outboard locations, one (1) each side as high as possible.

Two (2) lights and red reflectors shall also be mounted on the sides facing the side at the rear corners, for use as clearance lamps.

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

LED INTERMEDIATE TURN SIGNAL LIGHTING

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

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

INTERMEDIATE TURN SIGNALS

The intermediate turn signals will flash with the turn indicators.

BRITAX LIGHTING

There shall be two (2) LED Britax lights, model number 63-4610, with rubber stalk mounts installed on the body, one (1) each side, as far to the rear as possible.

REAR DIRECTIONAL LIGHTBAR

There shall be a Whelen model #TAM65 36.00 inch long directional lightbar with six (6) amber TIR-Super LED light heads provided and installed on the apparatus. The traffic advisor shall include model TACTL5 control head that includes remote flash control.

DIRECTIONAL LIGHTBAR LOCATION & PROTECTION

The rear directional light bar shall be installed directly above the rear ground ladder storage door.

A .125 inch embossed aluminum diamond plate light shield shall be installed directly above the rear directional light bar to protect the light bar from accidental damaged during hose loading and unloading operations. This light shield shall not be used as a stepping surface.

RDL CONTROL HEAD MOUNTING LOCATION

Rear Directional Lightbar control head shall be recess mounted in the center rocker panel at the center location.

REAR VIEW CAMERA LOCATION

A camera shipped loose with the chassis shall be surface mounted at the center location on the rear of the apparatus body for maximum viewing capability. A protective shroud shall be installed over the system to protect against damage.

SIDE SCENE LIGHT LOCATION

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

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. The lamp shall draw 6 amps and generate 6,500 lumens.

BODY SIDE SCENE LIGHT ACTIVATION

The scene lighting shall be activated by a virtual button on the Vista display control screen.

The switch shall be labeled as follows:

Side Scene

REAR SCENE LIGHTING

Rear scene lighting shall be located on the top of the body, at the rearmost location possible.

Two (2) FRC "So Brite" model SRA-07A series, 12VDC, LED scene lights, on appropriate mounting bases as required, shall be provided.

Light(s) shall include a white finish housing.

REAR SCENE LIGHT ACTIVATION

The rear scene lighting shall be activated when the apparatus transmission is shifted into reverse and by a weather resistant push button switch at the rear of the body on the vertical panel.

The switch shall be labeled as follows: Rear Scene

HARRISON HYDRAULIC 10,000 WATT GENERATOR

The generator shall be one (1) Harrison Hydraulic Driven Generator rated at 10,000 watts, 84/42 amps, 120/240VAC, 60Hz, 1-phase.

LINE VOLTAGE ELECTRICAL SYSTEM REQUIREMENTS

The specified line voltage power unit shall be installed with strict compliance with NFPA 1901 guidelines, and all associated components and equipment to be installed shall comply with NFPA 70 and applicable standards of the National Electrical Codes. Line voltage electrical system equipment and materials used with the system shall all be listed, properly installed in accordance with the manufacturer's instructions, and only in the manner for which they have been listed.

SYSTEM INSTALLATION AND WIRING

The generator system shall include proper grounding and bonding as required in NEC "Portable and Vehicle Mounted Generators". Non-grounded systems shall not be used. Only stranded or copper conductors shall be used for grounding and bonding purposes. An operator instruction plate, and generator rated performance specification plate, shall be permanently installed at the circuit breaker control panel.

Wiring shall be properly installed from the circuit breaker panel to all specified 120/240 volt accessories, including permanent circuit identification and rating specifications as applicable.

Wiring materials used for the specified accessories shall be either THHN type in non-metallic liquid tight flexible conduit, or heavy duty SO copper cable. Either type shall be rated for 600 volts at not less than 194 degrees Fahrenheit.

UL TESTING 110/220-VOLT & GENERATOR

The apparatus electrical and generator system shall be tested and UL, LLC certified in accordance with the requirements of NFPA 1901.

UL TESTING 110/220-VOLT & GENERATOR

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

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 two (2) years or 2000 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 DISPLAY

A FROG (Frequency Regulation of Generator) generator display kit shall be installed to monitor a 60 Hz, generator.

The kit shall include:

- Display module.
- Voltage transformer.
- 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:

- 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.

GENERATOR LOCATION

The unit shall be located on top of the body, in the area forward of the turntable, between the left and right side body compartments.

HOT SHIFT PTO

The generator hydraulic pump shall be attached directly to the rear of the aerial "Thru Drive" hydraulic pump which is driven by the "hot shift" PTO installed on the chassis transmission as

described elsewhere within these specifications. The PTO shall be ‘engaged’ by a switch in the cab.

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

GENERATOR EXCITE

The generator excite application shall be activated by a rocker switch located on the cab dash or other operator accessible area in the cab and by a weather resistant toggle switch located at the pump operator’s 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 up to twelve (12) single pole, manual reset type circuit breakers, two (2) of which will be utilized for the "Main" circuit.

LOAD CENTER L-2

The load center shall be recess mounted in the rearward wall of the L-2 compartment and shall be located as “best fit” to avoid interference and maintain functionality.

SIDE SCENE LIGHT LOCATION

There shall be two (2) scene lights installed on top of the body, one (1) each side, at the front body corners.

SCENE LIGHT MODEL

Whelen Pioneer model #PFP1AP pedestal mounted scene light shall be provided on the apparatus.

The 75 watt, 120v AC Pioneer lighthead shall measure 9.75 inches high by 10.81 inches wide by 6.06 inches deep. The lighthead shall produce 10,000 lumens and have an amp draw of 0.6 amps.

BODY SIDE SCENE LIGHT ACTIVATION

The scene lighting shall be activated by two (2) virtual buttons on the Vista display control screen and two (2) weather resistant toggle 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 #ECR series cord reel shall be installed on the apparatus as specified.

ELECTRICAL CORD

The reel shall come equipped with 200 feet of yellow 10-3 electrical cord. There shall also be a cord stop supplied with the reel.

DISTRIBUTION BOX

The cord shall be hardwired to a Circle D remote power distribution box with four (4) NEMA L5-20 single receptacles. The distribution box shall be stored in a mounting bracket when not in use. The box shall be equipped with a light to indicate when distribution box is energized.

The distribution box shall be equipped with the following receptacles:

Position 1: NEMA L5-20 R
Position 2: NEMA L5-20 R
Position 3: NEMA L5-20 R
Position 4: NEMA L5-20 R

The power distribution box shall be provided with a high visibility yellow exterior finish.

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 R-1 Compartment.

The reel shall be placed in the forward position of the above stated compartment.

ROLLER ASSEMBLY

There shall be a four (4) way roller assembly provided and fastened to the reel frame to guide the cord on and off the spool to prevent chafing on the body or compartment opening.

110 FOOT 750# TIP LOAD REAR MOUNT AERIAL LADDER SPECIFICATIONS

GENERAL INFORMATION

The aerial ladder assembly shall be a four (4) section telescoping steel ladder, with a pre-piped waterway, steel turntable, torque box and outriggers.

INTENT OF AERIAL SPECIFICATIONS

The intent of these specifications is to describe a telescoping elevating ladder of the true ladder type. It shall consist of four (4) steel ladder sections, a steel turntable, a tube torque box and four outriggers. The rated vertical height of the unit shall be **110'** and the rated horizontal reach shall be **99**'.

It is the intent of the purchaser that the device must meet all the requirements of the National Fire Protection Association's (NFPA) 1901, Standard for Automotive Fire Apparatus. It is also the intent of the purchaser to secure a fire service proven piece of apparatus that shall be manufactured in the U.S.A.

It is not the intent of the purchaser to deviate from this requirement; therefore, ladders attached to booms, whether solid or lattice, or articulating arms shall not be considered as meeting these specifications or the intent of these specifications.

DESIGN STANDARDS

The design criteria of the unit shall be to create a structure and system that emphasizes safety, product reliability, and ease of operation. These criteria are:

1. All structural load supporting elements of the aerial ladder that are made of a ductile material, shall have a design stress of not more than 50 % of the minimum yield strength of the material based on the combination of the rated capacity and the dead load. This 2:1 structural safety factor meets the American National Standards Institute (ANSI) and the current National Fire Protection Association (NFPA) 1901, Standard for Automotive Fire Apparatus, standard.

2. The aerial device shall be capable of sustaining a static load one and one-half times it's rated tip load capacity (live load), in every position in which the aerial device can be placed when the vehicle is on a firm and level surface.

3. The aerial device shall be capable of sustaining a static load one and one-third times it's rated capacity (live load) in every position in which the aerial devices can be placed when the vehicle is on a slope of five degrees downward in the direction most likely to cause overturning.

4. The hydraulic system shall be designed so that if a failure of any component or assembly within the system occurs, a single point failure of the entire system will not occur.

5. The aerial shall be capable of operating with a rated tip load of either of the two of the following conditions:

A. Conditions of high wind of up to 50 mph.
B. Conditions of icing, up to a coating of .25” over the entire aerial structure.

The manufacture shall state what wind and ice conditions their aerial device is capable of operating without reducing the rated tip load. NO EXCEPTION!

All of the design criteria must be supported by the following test data:

1. Strain gauge testing of the complete aerial device certified by a **Registered Professional Engineer**.

2. Analysis of deflection data taken while the aerial device was under test load.

3. Hydraulic component operating and burst strength testing.

MATERIAL STANDARD

All structural materials used in the aerial shall be certified by the mill of the manufactured material. Materials that are not certified shall not be acceptable.

GENERAL APPARATUS DESCRIPTION

The unit shall be designed to conform fully to the **"Aerial or Quint Fire Apparatus"**

requirements as stated in the (NFPA) 1901, Standard for Automotive Fire Apparatus, shall include the general requirements as stated in Chapter 4 for Aerial or Quint Apparatus.

AERIAL DEVICE MOUNTING

The elevating aerial device turntable shall be rear mounted thus providing the following vehicle benefits:

1. Improved mobility vs. mid-ship mounted units, due to shorter overall travel length and wheelbase.

2. Increased compartmentation, hose load and water capacity in body, resulting from the aerial being raised to clear the cab.

3. Shorter vehicle wheelbase.

4. Shorter overall length of vehicle.

HEIGHT AND REACH

The height of the unit shall be a minimum of **110'** as measured by (NFPA) 1901, Standard for Automotive Fire Apparatus, requirements, which requires the rated vertical height of an aerial ladder shall be measured in a vertical plane with the ladder at maximum elevation and extension from the outermost rung of the outermost fly section to the ground. The bidder will state the height of the unit as measured by (NFPA) 1901, Standard for Automotive Fire Apparatus, standards.

The horizontal reach of the unit shall be a minimum of **99'** as measured by (NFPA) 1901, Standard for Automotive Fire Apparatus, requirements, which states, “The rated horizontal reach of an aerial ladder shall be measured in a horizontal plane from the centerline of the turntable rotation to the outermost rung on the outermost fly section with the aerial ladder extended to its maximum horizontal reach." The bidder shall state the reach of the unit as measured by (NFPA) 1901, Standard for Automotive Fire Apparatus, standards.

WELDMENT FIXTURES

To ensure exact tolerances between parts and part interchangeability, all weldments shall be manufactured in fixtures. To further ensure weld integrity in all weldments, all aerial device fixtures must be able to position the weldments in the number 1 flat welding position resulting in maximum weld penetration in the welded material for both the tack and final weld process of the aerial device.

AERIAL PAINTING

Prior to any painting, all weldments such as the outrigger beams, torque box, turntable, and aerial ladder sections shall be shot blasted, cleaned and inspected to ensure the removal of any surface imperfections and to insure superior paint adhesion to the metal.

The entire painting system shall utilize a single manufacturer's paint for compatibility between primers and finished coats. The paint shall be AkzoNobel, Sikkens brand, “Top Coat”, applied throughout a multi-step process. All painting shall be done in atmosphere controlled spray booths. The weldments will be primed with a zinc corrosive inhibitor and an Epoxy Primer. All seams between adjoining pieces that are not continuously welded shall be caulked to inhibit corrosion.

Before assembly, in preparation for final painting, the aerial unit shall be thoroughly cleaned, conforming to good painting practices.

AERIAL DEVICE PAINT

The aerial ladder sections, Turntable base, side plates and deck structure shall be painted the same color unless specified otherwise.

The finished paint color shall be FLNA 96920 Metallic Gray to match FBCH 948387.

AERIAL APPARATUS CERTIFICATIONS (TYPE 1)

The aerial device shall be tested in compliance with the National Fire Protection Association's (NFPA) 1901, Standard for Automotive Fire Apparatus.

The following tests shall be conducted by personnel holding a Level II certification to detect defects and improperly secured components:

1. Magnetic particle inspection shall be conducted on all ferrous welds to assure the integrity of the weldments and also detect any flaws or weaknesses. These tests shall be performed prior to paint or assembly.

2. Ultrasonic inspection shall be used to detect any flaws in pins, bolts and other critical mounting components. The bolts shall be tested after they have been torqued to ensure the bolt was not damaged.

3. All extension/retraction cables shall be tested and certified by the cable vendor.

4. Functional tests, load tests, stability tests and visual structural examination shall be performed. These tests will determine any unusual deflection, vibration, or instability characteristic of the unit.

5. Hydraulic oil shall be sample tested prior to delivery.

6. A waterway system flow/pressure test shall be performed.

Upon completion of the preceding inspections, the independent testing company shall issue a Certificate of Inspection indicating that all specified standards have been satisfied. The Type I certification shall be provided by **Underwriters Laboratories, LLC (UL, LLC)**. Aerial

manufacturers not utilizing third party, independent testing companies shall not be acceptable.

TESTS

The following test shall be conducted to the aerial device prior to delivery; all listed tests shall be witnessed and certified by Underwriters Laboratories, LLC (UL, LLC) to ensure the device meets all current requirements of (NFPA) 1901, Standard for Automotive Fire Apparatus.

1. 1-1/2:1 DYNAMIC STABILITY AND LIFT TEST - A test of the apparatus shall be performed that the aerial device sections are so designed and powered to support a load representing 150% of the manufacturer's rated tip load capacity at maximum horizontal reach on level ground. Since this is a dynamic test, the load must be raised, lowered and rotated without evidence of instability.

2. 1-1/3:1 DYNAMIC STABILITY AND LIFT TEST - A test of the apparatus shall be performed that the tip and aerial device sections are so designed and powered to support a load representing 133% of the manufacturer's rated tip load capacity at maximum horizontal reach on a five (5) degree slope. Since this is a dynamic test, the load must be raised, lowered and rotated without evidence of instability.

3. TIME TEST - A test of the apparatus shall be performed to raise the ladder from a bedded position extended to full height and rotated through a 90 degree turn smoothly and without undue vibration in not over 120 seconds.

4. WATER TOWER TEST #1 - A test of the apparatus shall be performed to test its ability to discharge 1000 gallons per minute parallel to the aerial device with the unit at full extension and zero degree elevation. The unit shall be capable of performing this test while loaded to its rated tip load capacity.

5. WATER TOWER TEST #2 - A test of the apparatus shall be performed to test the ability to discharge 1000 gallons per minute, 90 degrees to the side of the aerial device with the unit at full extension, zero degree elevation. The unit shall be capable of performing this test while loaded to its rated tip load capacity.

Bidders must state their ability to comply with all of the above tests. Failure to do so shall be grounds for rejection of their bid.

AERIAL ELECTRICAL SYSTEM

12VDC electrical power for the aerial device shall be drawn from the chassis electrical system and routed through major segregated circuits and into an electric collector ring assembly. The circuits shall provide power for the aerial device controls, indicators, and interlocks; other circuits shall power auxiliary equipment such as lights, intercom, etc.

The electric collector ring assembly shall provide power for electrical ground, aerial device control functions, 12 and 120 volt systems. The collector rings shall be enclosed in a sealed, weatherproof housing to prevent corrosion.

All aerial device wiring shall be multi-conductor, copper 18 gauge (minimum), color-coded, with thermosetting cross-linked polyethylene insulation. All aerial device wiring shall be in pre-engineered harnesses with each circuit identified by number and color code. Harness connections shall be through locking, weatherproof, guided pin connectors.

HYDRAULIC SYSTEM

The hydraulic system shall provide power in as efficient a manner as possible. The system shall use a piston type load sensing pump and shall be capable of operating under any rated load condition and aerial position at normal engine idle (slow idle) or governor controlled fast idle. The piston pump shall be capable of generating sufficient flows to allow multiple function operation without significant loss of speed.

The system shall not be dependent upon an auxiliary cooler to control system temperature.

POWER TAKE OFF (PTO)

The apparatus shall be equipped with a "Hot-Shift" power take-off (PTO) driven by the chassis transmission as described elsewhere within these specifications. The PTO shall be actuated by an electric switch located inside the cab. An indicator light shall be located in the cab to show when the PTO is engaged.

A master "Aerial Power" switch shall be provided for engagement of all aerial device hydraulic functions and 12-volt power. The "Aerial Power" circuit shall only engage with the parking brake applied and the transmission in neutral or drive if the fire pump (if equipped) is engaged.

An indicator light shall be located in the cab to show when the "Aerial Power" circuit is energized. The emergency pump circuit shall be controlled separately.

AERIAL PTO HOURMETER

An hourmeter shall be installed in the chassis cab as described elsewhere within these specifications. The hourmeter shall be wired to the PTO circuit to record hours of PTO operation for the aerial device. The hourmeter shall aid in scheduling preventative maintenance as outlined in the operator's manual.

ENGINE HIGH IDLE ACTUATOR

The high idle actuator shall be used to raise the engine RPM to a preset level for proper aerial operation. The high idle switches shall be located in the chassis cab, at the stabilizer control station and the aerial control station.

For the safety of personnel and equipment, the high idle system shall not activate unless the interlock systems have been applied, the chassis spring brake is set, and the transmission is in neutral.

AERIAL HYD, PUMP

The aerial hydraulic pump shall be drive shaft driven directly from the chassis provided PTO.

The pump shall be "Thru Drive" in design to allow the generator hydraulic pump to be directly attached and powered by a single PTO output.

HYDRAULIC OIL RESERVOIR

A hydraulic oil reservoir shall be provided to supply the needs of the hydraulic system. The tank

shall be constructed from 7 gauge steel with welded interior and exterior seams. The tank shall be properly sized to provide optimal cooling and operational efficiency for the entire aerial hydraulic system.

Gated suction and drain lines shall be provided between the oil reservoir and the primary hydraulic pump. The tank fill shall be provided with a strainer screen, vent cap and magnetic drain plug. There shall be a sight level gauge for checking fluid levels.

The tank shall be cleaned and free from all contaminants before adding any fluid.

HYDRAULIC SYSTEM FILTRATION

Outgoing and return line filtration shall be provided. The pressure and return filters shall be easily accessible for maintenance.

Outgoing filtration shall be in the form of a pressure line filter installed between the hydraulic pump and entrance to any system components. The filter shall have an absolute rating of ten (10) microns. The pressure filter shall have a bypass circuit protected by a 50-psi check valve, which shall be installed around the pressure filter. The pressure line filter shall be required even if a suction line filter is provided in the reservoir due to the suction line filter's inability to trap contaminates entering the system.

A filter condition indicator shall be provided.

The return line flow shall be filtered by means of a return line filter. This filter shall have an absolute rating of ten (10) microns.

EMERGENCY HYDRAULIC PUMP SYSTEM

In the event of failure of the main hydraulic pump or vehicle engine, the unit shall be equipped with an emergency hydraulic pump.

The pump shall be plumbed into the hydraulic system and shall be electrically driven from the chassis batteries. The emergency pump shall be capable of limited functions of the ladder and outriggers to stow the unit. The pump shall be controlled from the right and left outrigger control stations with spring loaded momentary contact switches.

The emergency pump shall have a separate hydraulic oil supply line, attached directly to the hydraulic oil reservoir. A shutoff valve shall be provided, and a check valve shall be incorporated on the pressure side of the pump.

HYDRAULIC HOSE, TUBING AND FITTINGS

All hydraulic steel tubing, hydraulic rubber covered wire-braided hoses, and hydraulic fittings/adapters shall have a minimum burst pressure rating of four times the operating pressure. Hoses and tubing shall be properly sized to minimize heat buildup during extended periods of operation. Hoses and tubing shall be properly sized to minimize flow restrictions.

All hydraulic hose shall have a tube and cover constructed of Nitrile elastomers and shall have braided/spiral wire reinforcement capable of maintaining a 4:1 safety factor in all areas of the hydraulic system. The hose shall meet the appropriate SAE performance specifications: 100 R2

or 100R12.

SUPPLEMENTAL AERIAL HOURMETER

An additional aerial hourmeter shall be installed inside the turntable control console pedestal to record the actual hours that the aerial device is in motion. The hourmeter shall aid in scheduling preventative maintenance as outlined in the operator's manual.
The hourmeter shall be analog and require no switching to be turned "On" in order to read the display.

OUTRIGGER/AERIAL INTERLOCK

The aerial hydraulic system shall include an interlock feature that will prevent the accidental operation of the outriggers during aerial operation. This interlock shall also prevent accidental operation of the aerial device prior to the outriggers being properly deployed.

In the event of electrical failure, the operator shall be able to override the hydraulic system to operate the aerial device or outriggers for continuous, uninterrupted operation. A 5,000 psi hydraulic oil pressure gauge shall be provided and installed at the override location to monitor the overall pressure of the hydraulic system.

LIFT, EXTENSION AND ROTATION HYDRAULIC CONTROL VALVE

A three-function hydraulic proportional valve bank shall control ladder functions. The valve shall be located at the turntable with direct linkage controls.

TORQUE BOX

A tube torque box sub-frame shall be provided to transfer all aerial loads and torque into the four (4) outriggers, thus preventing the loads from being transferred through the chassis.

The torque box shall include two (2) "H-Box" (outrigger housing) weldments, forming a single structural weldment for aerial load distribution among the outriggers.

The torque box shall be bolted to the chassis frame with .75” SAE grade 8 bolts.

TORQUE BOX PAINT

The finished paint color shall be FLNA 41878 (to match 9000) black.

OUTRIGGERS

The apparatus shall be equipped with four (4) "H" style "out and down" outriggers. The extension of the horizontal outrigger beams shall provide a 14’ outrigger stance.

Five (5) slide pads shall be provided for each outrigger beam assembly to provide smooth operation and to extend the life of the outrigger.

The front outriggers shall be mounted at the front of the body. This design shall provide proper stability and minimize front axle and suspension loads while the aerial device is in operation over

the front of the apparatus. The rear outriggers shall be mounted underneath the chassis frame to allow more ground ladder storage above the frame.

For ease of maintenance, the outrigger extension cylinders shall be equipped with end connections, which do not require removal of body panels to remove pins or the extension cylinders. The outrigger jack cylinders shall be removable by unbolting the jack tower cap and lifting the cylinder out vertically.

OUTRIGGER SYSTEM HYDRAULIC CONTROL VALVES

A directional control valve that is designed for parallel hydraulic circuit operations shall control the outrigger cylinder system. This valve shall be modular in design so that individual sections can be replaced in the field, rather than complete valve assemblies, thus reducing maintenance costs. Each valve shall be equipped with a heavy-duty electric solenoid for electric control of the outrigger from the remote operator's station.

OUTRIGGER CONTROLS

Two (2) illuminated outrigger control stations shall be provided, one (1) on each side of the rear of the vehicle. For safety, ease of deployment and operational speed, the outrigger controls shall be of the electric over hydraulic proportional type with manual overrides immediately accessible.

The outrigger controls shall be enclosed in a recessed compartment to protect each control from damage or accidental movement. The controls shall be located such that the operator can see the outrigger he is operating. Body designs that block the view of the outriggers from the control station shall not be acceptable.

Each outrigger control function shall be operated independently, so that the vehicle may be set up in restricted areas or on uneven terrain.

Each outrigger control station shall incorporate the following:
-Outrigger beam and jack actuator controller
-Outrigger/Jack deployed indicator light
-Fast idle switch
-Emergency pump control switch
-Warning decals

OBSTRUCTION DETECTION & DISPLAY SYSTEM

The O.D.D.S (Obstruction Detection & Display System) shall incorporate a sonic emitter and sensor on each outrigger to detect obstacles in the potential path of each outrigger as the apparatus approaches the fire scene for deployment.

O.D.D.S DISPLAYED ON VISTA

When activated, a representation of each outrigger shall be provided on the Vista Display in the cab. If no obstructions are detected, the outriggers shall be shown in the extended position. If an obstruction is detected in the potential path of any outrigger, that outrigger will not be displayed.

An O.D.D.S enable switch shall be provided on the Vista Display.

EXTENSION CYLINDERS

Each extension cylinder shall have a 3.00" internal bore with a minimum 2.00" chrome plated cylinder rod.

The extension cylinders shall be fully enclosed within the outrigger beam, preventing them from being nicked or scored during operations on the fire ground.

JACK CYLINDERS

Each jack cylinder shall have a 5.00" internal bore with a 3.50" chrome plated cylinder rod. The jack cylinders shall be equipped with integral (on the cylinder) holding valves, which shall hold the jack cylinder in either the stowed position or the deployed position should a hydraulic line be severed at any point within the hydraulic system.

To minimize side loading and subsequent seal failure of the vertical jack cylinder, a 1.62" wide load bearing UHMW wear band shall encircle the jack cylinder barrel, providing load distribution over a 360 degree plane. Designs which could allow load concentration on one side of the vertical jack cylinder shall not be acceptable.

In order to provide faster setup time for the aerial on the fire ground, and to eliminate the possibility of damage to the housing should the outriggers be retracted with the jack pins left in, designs that require the use of jack pins shall not be acceptable.

For ease of maintenance, the outer jack tube shall be designed so that the cylinder can be removed from the top. Designs that require the outrigger beams to be removed or the jack cylinder positioned over a pit for jack cylinder removal, shall not be acceptable.

OUTRIGGER BEAM PAINT

The finished paint color shall be FLNA 96920 METALLIC GRAY.

OUTRIGGER PADS

A permanently attached self-centering floating type 1/2" thick, 154 sq. inch steel pad shall be provided on each outrigger. The pad shall swivel and require no adjustment during outrigger set-up.

The outrigger pad shall be attached without the use of a bearing type swivel due to maintenance required on this design. Outrigger pads that pivot in only one plane shall not be acceptable due to their inability to distribute loading over the total pad surface on uneven terrain.

AUXILIARY OUTRIGGER PADS

Four (4) auxiliary outrigger ground pads shall be provided for additional load distribution. Each ground pad shall be fabricated of 6061-T6 high strength aluminum alloy and shall measure 3/8" x 24" x 24". Each ground pad shall be equipped with a handle for easy use.

AERIAL/OUTRIGGER INTERLOCK SYSTEM

An interlock system shall be provided between the outriggers and aerial device that prevents the

operation of the aerial until the operator places all jacks in the load-supporting configuration. All jacks shall be equipped with a ground force sensitive switch that closes only when the jack is firmly in contact with the ground.

Until all the switches close, electrical and hydraulic power shall not be transmitted to the turntable, hence preventing aerial operation. Green indicator lights shall be provided on the outrigger control panel to indicate that the outrigger foot is in firm contact with the ground and in a load supporting position.

OUTRIGGER/STABILIZER DEPLOYMENT WARNING ALARM

An audible warning device shall be provided to warn personnel in the vicinity of the apparatus that the outriggers/stabilizers are in motion.

Whenever an outrigger/stabilizer control handle is utilized, the device shall produce a pulsing tone, separate and distinctive from that of other audible warning systems provided on the apparatus. When the control handle is released to its neutral position, the signal shall cease.

The warning device shall automatically enable the dB level to be raised or lowered by measurements of the ambient noise level.

OUTRIGGER LIGHTING AND REFLECTIVE STRIPING

Each outrigger shall be equipped with the following light and reflective striping package:

OUTRIGGER REFLECTIVE STRIPING

Retro-reflective material shall be provided and installed on both sides of the horizontal and vertical beams of the outriggers.

OUTRIGGER LIGHTING

There shall be an LED ground illumination light located at each outrigger or downrigger location to illuminate the footpad area.

The lights provided shall be TecNiq model T44 series, 4" round, 8 diode LED lights.

Truck Lite 7” round LED red flashing lights shall be provided as warning lights when the outrigger beams are extended.

Each stabilizer beam shall be equipped with a total of two (2) lights, one (1) facing forward and one (1) facing rearward. The lights shall be mounted inboard of vertical jack tubes.

Both the foot pad illumination lights and the flashing outrigger warning lights shall be activated by the aerial power switch.

TURNTABLE/TURNTABLE DECK

The turntable shall be a fabricated steel weldment designed for the rotation and elevation of the ladder sections. It shall consist of the following:

A steel bearing plate and matching top plate shall be machined to ensure proper fit to the rotation bearing. Manufactures that do not mill both bearing surfaces shall not be acceptable.

Embossed aluminum diamond plate deck shall cover the entire turntable frame, providing a walking surface.

An embossed aluminum diamond plate access step shall be mounted at heel of the ladder.

All handrails shall be a minimum of 42” high. For ease of grip, the handrail shall be manufactured from 1-1/4" O.D. knurled stainless steel material.

Turntables with the drive motor or breathing air bottles mounted in any walking areas (front or rear) of the turntable shall not be acceptable.

The right side of the turntable deck shall be designed to allow access to the side hose bed.

TURNTABLE ACCESS SAFETY CHAINS

The two (2) turntable handrail openings shall be equipped with safety chains at the rear of the turntable.

CRADLE ALIGNMENT INDICATOR ARROWS

Aluminum arrows with red Scotch-Lite coating shall be provided on the turntable surface, and on the apparatus body to indicate the alignment of the aerial device with the travel cradle. The indicators shall be suitably illuminated for nighttime operation.

Mechanical fasteners shall be used for installation.

AERIAL CONTROL STATION

There shall be an aerial control station located at the turntable. All elevation, extension and rotation operational controls shall operate from this position. These controls shall be arranged to permit the operator to regulate the speed of these operations within the safe limits as determined by the manufacturer. Load instruction plates shall be located at the control station to show the recommended safe load of the ladder. The control devices shall be clearly marked and suitably lighted.

TURN TABLE CONTROL STATION

The control station shall be located on the left side of the turntable, as the operator is facing the tip of the nested aerial ladder (Driver's side of the apparatus), in order to provide increased visibility of the ladder tip while operating the controls. The pedestal shall be set forward, away from the operator, to provide additional foot room.

The pedestal shall be constructed from an aluminum framework with an aluminum diamond plate wrapper. Access to the electrical and hydraulic components mounted inside the console shall be provided by either hinged doors or removable access panels. A hinged cover shall be provided over the console to protect the panel and controls. The top of the console shall be angled to face the operator for ease of ladder operation.

The console and turntable working areas shall be illuminated for night operations and shall have all controls and indicators clearly marked.

Controls and indicators provided shall include, but shall not be limited to;

Three (3) ladder function control levers.

A recessed, foot operated **"Operator Presence"** switch, which shall protect against accidental movement of the control handles.

Rung alignment indicator light for ladder climbing operations.

Cradle alignment indicator light on console.

Engine high idle control switch.

Outriggers Not Deployed Indicator Lights.

Intercom controls in console lid.

Bubble type angle indicator on base section near console.

Illuminated load chart.

Tracking Light Switch.

Tip Light Switch.

Monitor/Nozzle Control Switches.

Monitor Stowed Indicator.

Flowminder Display (If Selected).

Hydraulic Oil Pressure Gauge

Any additional switches and/or displays required by other options described elsewhere within these specifications, as available space permits.

The control console lid shall be provided with a black Line X finish.

AIR HORN BUTTON

An air horn button shall be provided at the turntable control console.

HYDRAULIC, ELECTRIC AND WATER SWIVEL

Hydraulic power to the turntable hydraulic circuits shall be provided through a three-port, high pressure hydraulic swivel permitting 360 degrees continuous rotation of the turntable.

Water shall be transferred to the aerial waterway by means of a 4" internal diameter water swivel, permitting 360 degree continuous rotation.

Electric power to the turntable electric circuits shall be comprised of a minimum of twenty two (22) ring collector assembly, permitting 360 degree continuous rotation of the turntable.

ELEVATION SYSTEM

Two (2) double-acting lift cylinders shall provide smooth, precise elevation from 7 degrees below horizontal to 78 degrees above horizontal. Units that do not operate below minus 6 degrees shall not be acceptable.

The lift cylinders shall have a 6" internal diameter, 3-1/2" diameter cylinder rod and a 36-1/8" stroke. Integral cylinder holding valves shall be provided to prevent the unit from lowering should the charge lines be severed at any point within the hydraulic system. Units that do not use holding valves on the cylinders shall not be acceptable. A hydraulic holding valve shall be provided in the elevation circuit to retain the aerial ladder in its bed when the vehicle is in motion.

The elevation cylinders shall be provided with both rod and piston "hydraulic cushions". The cushions shall serve to decelerate the cylinder near the end of its stroke resulting in a smooth stop at full cylinder stroke.

AERIAL INTERLOCK SYSTEM

A limit switch at the aerial travel support shall be provided to prevent operation of the outriggers/stabilizers once the aerial device has been elevated from the nested position.

EXTENSION/RETRACTION SYSTEM

A full hydraulic powered extension and retraction system of the ladder shall be provided through dual hydraulic cylinders and cables, each capable of operating the ladder in the event of failure of one of the systems.

The extension/retraction cylinders shall be equipped with integral (on the cylinder) holding valves to prevent the unit from falling should the charge lines be severed any point within the hydraulic system.

The extension cylinders shall be provided with both rod and piston "hydraulic cushions." The cushions shall serve to decelerate the cylinder near the end of its stroke resulting in a smooth stop at full cylinder stroke.

Cylinders in excess of 25 feet with the rod extended, or that require the attachment of the rod to the mid-section, shall not be desirable for two (2) reasons that are not consistent with the level of quality desired by the purchaser:

- Rod attachment to the mid-section requires that the lower rung rail cannot be sealed from the atmosphere and therefore long-term corrosion cannot be adequately controlled.
- The cylinder shall be subjected to the buckling forces caused by normal ladder deflection.

Cables attached to the base and mid ladder sections shall be routed over sheave wheels on the base section and cylinder barrel. This cabling arrangement shall act as a stroke multiplier to provide full-power ladder extension and retraction. Extension of the ladder sections shall be accomplished by the movement of the cylinder barrel toward the turntable end of the base section, thus providing better weight distribution when the ladder is extended.

Retraction of the ladder sections shall be accomplished by movement of the barrel toward the outboard end of the base section, thus providing better weight distribution between front and rear axles of the apparatus when stowed in the travel position.

The extension/retraction cables shall have a minimum safety factor of 5:1 and shall be of the following diameters:

- Inner Mid-Section: 9/16"
- Outer Mid-Section: 3/8"
- Fly Section: 1/4".

EXTENSION INDICATORS

Reflective numerals shall be affixed to the inside of the handrail of the base section opposite the turntable control console. The numerals shall be at appropriate intervals indicating total aerial extension in 10-foot increments. A band on the first fly section shall align with these marks at the appropriate extension distance. An additional stripe shall be provided between the numbered stripes to indicate each 5 feet of aerial extension.

The extension indicator color shall provide a high contrast with the color of the ladder section to which it is applied.

This shall make the length of aerial extension easily readable by the operator by merely glancing at the indicators.

The extension markers shall be provided in red reflective material.

LADDER SLIDE MECHANISM

UHMW slide pads shall be provided on each ladder section for load transfer between sections. Slide pads shall be used on both upper and lower bearing surfaces and to control side sway of the sections.

The pads shall utilize low coefficient of friction materials to reduce the resistance between the pads and ladder sections. The ladder rails shall be sprayed with a rust prohibitive paint designed to ride on a set of pads which require no greasing of the rails.

In order to maintain a high “in service” level of operation, the ladder shall be designed to require minimum amounts of lubrication.

AIR/ELECTRIC LADDER TRACK

All air and electric line routing from the turntable to the tip of the aerial device shall be accomplished using a flexible conduit system. Routing shall be such that cables shall be fully enclosed except at points of transition between sections.

The conduit shall run along the handrail uprights, between the ladder sections, so the conduit does not decrease the interior width of the ladder.

ROTATION SYSTEM

An external tooth monorace bearing shall be provided for 360 degree continuous rotation in either direction. To ensure proper bearing installation and long service life, surfaces of both the open base bearing plate and the turntable bearing plate shall be milled. Units that do not have milled bearing surfaces shall not be acceptable.

The bearing shall be bolted to the turntable and bolted to the open base support plate, using 7/8" diameter Grade 8 bolts. A planetary drive, powered by a hydraulic motor, shall provide precision rotation control throughout 360 degrees of rotation.

A spring-applied, hydraulically released disc type brake shall be furnished to provide positive braking of the turntable assembly against reactionary forces such as water flow and gravity.

The turntable rotation bearing shall be easily accessible for lubrication and retorquing of bolts from the turntable side, for ease of access.

Access to the turntable bearing bolts which requires the removal of the ground ladders and/or the ground ladder slide assemblies, during bolt retorquing process, shall not be acceptable.

ROTATION SAFETY SYSTEM

The Rotation Safety System shall be designed to prevent the operator who has primary operational responsibility from rotating the aerial device into an overturning mode. This system senses outrigger and outrigger jack positioning in conjunction with the aerial device movement. Indicator lights shall be provided on the turntable control console to indicate outrigger not fully deployed status.

If the aerial device operator attempts to rotate the aerial device (in excess of approximately 5 degrees beyond vehicle center) towards the side of the vehicle in which the outriggers are not fully deployed, the Rotation Safety System shall sense this fault and prevent the aerial from rotating further in said direction. At this point, only rotation to the fully deployed outrigger side shall be allowed.

AL-11 AERIAL INFORMATION SYSTEM

Aerial Logic Display

The aerial shall be equipped with a 7” color transmissive TFT LCD display located at the turntable control console. The display shall be viewable in direct sunlight, with a resolution of WVGA, 800 x 480 pixels, 16-bit color and an aspect ratio of 16:9.

The display shall feature LED backlighting, 1000 nit typical brightness (40,000 h lifetime). The display shall include an internal microprocessor Freescale IMX. 375 32bit, 532 MHz utilizing a QNX operating system. The display shall have a minimum 2 GB RAM flash memory and 128 Mbytes SDRAM. The display shall support J1939 and NMEA 2000 protocols.

For protection against extreme environmental conditions, connections shall utilize 2 Ampseal 23 pin connectors AMP770680-1 and AMP770680-4. User inputs shall be accomplished utilizing 14 tactile buttons located directly on the display. The display shall be capable of operating -40º C to +85º C and a minimum IP67 rating front and back. For maximum protection, the display case shall be constructed of Polycarbonate capable of random vibration, 7.86 Grms (5.2000 Hz), 3 axis and a shock of +/- 50G in 3 axis.

The display will gather ladder positional data from an array of sensors. This data will not only be displayed for the device operator, but the rotation and elevation sensors will also be used to protect the body, cab, and installed components from collision damage caused by the aerial device. The system shall be designed to warn the aerial device operator when the ladder is in a position where contact could occur while rotating the ladder at low angles and while lowering the ladder when it is positioned over the cab/body. The system shall prevent the aerial device from contacting the cab/body of the apparatus.

A visual and audible alarm shall be provided at the turntable control console. The system shall remain in the warning mode while the ladder is in a position where contact could occur. It shall deactivate only when the ladder is rotated away or elevated above the contact zone area.

A manual override shall be provided.

Indication for the load sensing system shall also be programmed into the AL-11 system at each of the control consoles.

Soft Keys

Columns of vertical keys shall be located to the left and/or right of the display. The soft keys correspond to the soft key commands and allow selections with a gloved hand. Icons shall be displayed on the screen adjacent to the soft key and will change according to the options available for the screen being displayed.

Screens

The display shall provide the operator with critical aerial information and switching of aerial electrical components in an easy to read format as follows:
•Extension Retraction Percentage – Digital readout shown 0% - 100%
•Ladder Angle -15 to 90 Degrees (Operational range of Aerial -8 to +72 Degrees)

•Rotation Position – 0 - 360 Degrees
•Ladder Load Percentage - Display live loads acting on the aerial structure shown as 0 - 100%
•Breathing Air – 0-6000 Psi (This is available only if optional breathing air has been specified)
•Bed Zone Alignment Light – When the aerial is aligned and within the bed zone the indicator shall change to a bright color to indicate it is safe to bed the aerial.

•Rung alignment light – When the aerial rungs of each section are aligned the indicator shall change to a bright color to indicate the rungs are aligned to provide safer climbing of the aerial.

Soft keys located on each side of the display shall be programmed to allow the operator to quickly change screens to view the following:

•High Idle – Label shall read “High Idle”. Pressing this soft key shall increase engine RPM to the

chassis pre-set high idle, pressing the button again shall return engine RPM to the chassis pre-set idle. The indicator shall change to a bright color to indicate the high idle has been activated.

•Emergency Power Unit - Label shall read “EPU”. Pressing this soft key shall activate the electric over hydraulic emergency power unit.
Engine Information Screen – An icon depicting an engine shall be displayed next to the soft key. Pressing this button shall allow the operator to switch to the screen displaying chassis engine information.
Day/Night Display Mode - An icon depicting the sun or the moon shall be displayed next to the soft key, pressing this button shall switch the display to from a bright format for daytime use or a subdued format for nighttime use to maintain greater vision of the operator.

Lighting /Customer Information Screen - An icon depicting a light bulb shall be displayed next to the soft key, pressing this button shall switch the screen from its current screen to the screen to control lighting on the aerial.

The following information shall be displayed on the aerial logic display:
•Customer name
•Production number
•Aerial device type
•Aerial device model number

•Aerial device serial number
•Rated vertical height
•Rated horizontal reach
•Rated capacity
•Contact information for the fire apparatus manufacturer. Information shall include name, address, phone number and website

Chassis Engine Information Screen

•Engine coolant temperature
•Oil pressure
•Transmission temperature
•Fuel level
•Battery voltage
•Engine RPM
•Engine Warnings – To include: Check Engine, Stop Engine, DPF Regeneration Required, Regeneration Status and High Exhaust Temperature.

HEAVY DUTY LADDER TRAVEL SUPPORT

A heavy duty ladder rest shall be provided for support of the ladder in the travel position. The ladder rest shall be attached to the chassis frame rails immediately rearward of the cab. The travel support shall be fabricated from heavy duty steel tubing and shall be designed to be easily removable to allow for ease of maintenance and repair if necessary.

The base section of the ladder shall contain stainless steel scuff plates where the ladder comes into contact with the ladder support. The travel rest shall be painted to match the torque box.

An indicator light shall be provided on the turntable to indicate when the ladder is aligned with the travel support and may be lowered into it.

AERIAL LADDER SECTION CONSTRUCTION

The aerial ladder shall be comprised of four (4) sections. The ladder section design objective shall complement the support of heavy or uneven aerial loads at low angles of elevation, or at full extension.

Each ladder section shall be fabricated in fixtures assuring uniformity, replace ability, or changeability, and shall be welded in accordance with American Welding Standards (AWS) criteria by certified welders.

The ladder sections shall be constructed of welded high-strength steel throughout. Each section shall be trussed diagonally, vertically, and horizontally, using steel rectangular tubing, reinforced at critical points for extra rigidity, thus giving a high strength-to-weight ratio. Each section shall be equipped with 1-1/4" diameter rungs, placed at no greater than 14-inch centers for ease of climbing.

To assure the level of quality desired, each ladder section shall include the following:

1. Base Section - All rails, including the lower rail, shall be sealed from the atmosphere. The base ladder section shall include a triangulated lifting configuration. This arrangement shall consist of front and rear cross tubes, forward triangle tube, rear triangle tube, lift cylinder outboard support tube and steel plating welded into place where the lifting cylinders attach to the aerial ladder base section.

2. Mid-Section, Outer Mid-Section and Fly Section - All rails, including the lower rung rail, shall be sealed as described for the base section.

All ladder rungs shall be welded to each rung rail section in two (2) places. K-bracing shall be provided between the rungs and the ladder rung rails to provide the ability to discharge water at 90 degrees to the side of the ladder.

All rungs shall be round and covered with deeply serrated, replaceable, heavy duty rubber sheaths, which shall be both glued and clamped securely to the rungs with metal clips. Due to high maintenance cost and difficulty in replacement of anti-slip rung surface and the inability to provide a safe surface during icing conditions, ladder designs that do not utilize rubber rung covers shall not be acceptable.

LADDER SECTION DIMENSIONS

All bidders shall state in the space provided below their dimensions on the unit proposed. Dimensions proposed must equal or exceed these specified. All Dimensions are from top of rung to top of handrail. All width dimensions are inside to inside of handrails.

Handrail	Height	Width
Base Section	24.00"	36.25”
Inner Mid	21.75"	31.00"
Outer Mid	20.00"	25.75"
Fly	18.125"	21.75”

OVERLAP SURFACES BETWEEN SECTIONS

Base to Inner Mid Fly Section	90.00"
Inner Mid Fly to Outer Mid-Section	90.00"
Outer Mid Fly to Fly Section	90.00"

LADDER EGRESS

A removable bolt on stainless steel egress shall be installed on the tip of the fly section. Only certified structural fasteners shall be utilized to attach the egress to the tip of the fly section. Additionally, the fasteners shall be stainless steel. This design shall allow for easy replacement should the egress become damaged during rescue operations. This shall prevent the department from experiencing serious downtime, as is common with welded on egresses. For this reason, a design that allows the egress to be welded to the fly section shall not be acceptable.

The egress shall have knurled handrails with an extended radius design at the tip to eliminate corner joints and increase strength. The straight design of the egress will allow the aerial waterway monitor/nozzle to be placed up to 30 degrees above horizontal centerline for additional range of water stream operation.

The rungs on the egress shall be held to the same design load criteria as the rungs of the aerial ladder sections. This mean that each egress rung shall be able to support the tip load rating of the aerial device, distributed across the rung as specified in NFPA 1901. This shall be in excess of that required by the aforementioned standard. The egress shall be left in a "Natural" Stainless Steel finish.

FLY SECTION FOLDING STEPS

Two (2) spring-loaded aluminum folding steps with non-slip aluminum grating inserts shall be installed in the fly section of the aerial to provide footing for an operator stationed at the tip of the fly section. Springs shall hold the steps in place during use and secure the steps in the stowed position when not in use. Each step shall have a surface area of 72 square inches and a minimum design load of 500 lbs. A folding Toe "Kick Plate" shall be provided at the forward edge of each step surface.

AERIAL WATER SYSTEM

The aerial waterway system shall be capable of being supplied by both the pump and an external water source with the inlet on the rear of the apparatus.

All piping from the pump and the inlet at the rear of the apparatus to the riser pipe below the turntable swivel shall be 4" Schedule 40 aluminum 6061 T6 pipe. A 4" tee shall join the pump discharge line and the rear inlet line.

A 4" water swivel shall be located in the riser pipe from the tee permitting 360-degree continuous rotation of the aerial device.

A 4" heel pin swivel connection between the aerial device waterway and the turntable swivel permitting water tower operations thru full aerial elevation range shall be provided.

A 2-1/2" automatic relief/dump valve shall be installed in the 4.00" lower water piping.

A 1-1/2" drain with valve control at the rear shall be provided to drain the aerial device water system.

TELESCOPIC WATERWAY

An anodized aluminum telescopic waterway shall be mounted beneath the center of the aerial ladder. The waterway shall have a 5" base section tube, 4-1/2" lower mid-section tube, 4" upper mid-section tube and a 3-1/2" fly section tube.

WATER SYSTEM FRICTION LOSS

As per NFPA, the friction loss (total system loss less head loss) shall not exceed 100 psi at 1000 GPM flow with the aerial device at full horizontal extension. The pressure reading for friction loss measurement shall be taken at the base of the monitor and at a point below the waterway swivel.

AERIAL WATERWAY FLOWMETER

The apparatus shall be equipped with a Class 1 Flowminder, model #FMS at the aerial discharge waterway to give the aerial operator an indication of actual volume of water (in gallons per minute) being discharged through the line. Display shall be located at the aerial operator's control console.

Flowminder system shall consist of:

1. A digital display shall be wired to the flow transmitter to show waterway discharge flow.
2. A flow transmitter mounted in the discharge line piping between the pump/inlet and the discharge outlet. The transmitter shall consist of a weather resistant black composite housing with a stainless steel, durable paddle wheel. The only part inserted into the water flow path shall be the paddle wheel.

The flowmeter shall be checked and calibrated prior to delivery of the apparatus.

MOVABLE MONITOR FEATURE

The aerial ladder waterway monitor shall be capable of being positioned at either the fly section for water tower operation or at the next lower ladder section for rescue. The aerial ladder shall be capable of full extension and operation when the waterway is connected to either section of the ladder.

The waterway and monitor shall have a positive lever type latching system to secure them either to the tip of the fly section or next lower section of the aerial ladder. A latching system requiring a pin to be removed from one location and repositioned into another location shall not be acceptable due to the possibility of dropping the latching pin.

The monitor shall be remotely operable from either position and shall transfer the electrical power and controls automatically. When operated from the rescue position (mid-section), the vertical range of motion of the monitor shall be limited to 0 degrees (horizontal center line of the aerial ladder).

Due to problems associated with aligning electrical connectors used to transfer power between rescue and water tower positions, the power transfer shall be achieved by a cable carrier system.

AERIAL WATER SYSTEM

A minimum 4" water swivel shall connect from the aerial waterway supply piping to the telescopic aerial waterway. The water swivel shall permit full operation at any elevation of the aerial device. The aerial waterway pipes shall be designed to reduce friction loss in the waterway.

All aerial waterway piping shall be completely removable for service or replacement. Aerial designs in which the waterway is welded or utilized for structural integrity of the aerial shall not be acceptable.

ELECTRICALLY CONTROLLED MONITOR

An Akron Brass, model 3480 StreamMaster II, 2000 gpm electric monitor, constructed of lightweight Pyrolite, shall be installed on the outer end of the telescoping aerial waterway. The monitor relay box shall be located on at the tip of the aerial device, adjacent to the monitor, and will be easily accessible for service.

The monitor and nozzle functions shall be controlled from the tip of the fly section through hard wired connections and wirelessly from each of the aerial control station(s) specified. The monitor and nozzle controls at the tip and optional control stations shall consist of three (3) individual spring loaded, self-centering, and weather resistant toggle switches.

The monitor shall be capable of a vertical sweep of 165 degrees, and a horizontal sweep of 180 degrees (90 degrees to each side of the aerial center line).

NOTE: Monitor operation above 0 degrees (horizontal center line of the aerial ladder) reduces payload capacity by 250 lbs.

A guarded, momentary "Monitor Stow" switch shall be provided and installed on the turntable control console.

NOZZLE

An Akron Brass, model 5178, Akromatic 2000 electric combination fog and straight stream nozzle with automatic flow mechanism that provides a flow range of 500 to 2000 gpm at 80 psi shall be provided. The nozzle shall be constructed of durable, lightweight Pyrolite and shall have electric pattern selection from straight stream to wide fog controlled by a 12V motor and linear ball screw, a manual override pattern control knob, and a built-in stream shaper.

LADDER CAPACITIES

The following ladder tip load capacities shall be established with the truck level; the outriggers fully extended and lowered to relieve the chassis weight from the axles. All capacities are based upon full extension and 360 degree rotation.

AERIAL CRITERIA AND STANDARDS

The following aerial ladder and water capabilities shall be established in the unsupported configuration with the truck level, the outriggers fully extended and lowered to relieve the chassis weight from the suspension. The capacities shall be based upon 360 degree continuous rotation and up to full extension. The ratings shall be based on average weight of personnel on ladder 250 lbs. each.

LADDER OPERATIONS

The ladder shall be designed to permit a 750 pound tip load, up to full ladder extension from -7 to 78 degree elevation.

WATER TOWER OPERATION

The ladder and water system shall be designed to permit 1500 GPM flow with water stream parallel to ladder or 90 degrees to either side of the ladder. The stream elevation shall be from 0 degrees above horizontal to 135 degrees below horizontal.

With the above flow rating, the ladder shall be capable of -7 to 78 degree elevation at full extension with a 500 pound tip load.

Note: Monitor operation above 0 degrees (horizontal center line of the aerial ladder) reduces payload capacity by 250 lbs.

OPERATIONS ON GRADES

The aerial unit shall be capable of operating with 100% of rated capacity on a slope of up to 10.5 degrees. Operating capacity shall be reduced to 50 % capacity for operating on a slope of 10.6 degrees to 15 degrees. Operation beyond a 10.5 degree slope shall be at operator's discretion. Devices that cannot provide this leveling capability are not acceptable.

COMMUNICATION SYSTEM

A Fire Research ICA900 Series (ACT) communication system shall be provided and installed between the aerial device tip and the aerial operator's position. The communication speaker at the tip shall require no operator attention to transmit or receive. The transmitting receiving volume controls shall be located at the aerial operator's position. These control modules shall have an LED volume display and push-button volume control.

AERIAL TIP LOCATOR LIGHTS

Two (2) lights shall be installed at the tip of the aerial device, one (1) each side, to help locate the tip of the aerial during fire ground operations.

Whelen L51AP series, LED beacons shall be provided and installed as specified.

The light(s) shall be amber in color.

AERIAL SPOTLIGHTS

All 12VDC aerial spotlights lights shall be mounted below handrail height, so as not to increase the overall height of the vehicle.

TRACKING LIGHTS

Two lights shall be mounted at the lower front portion of the base ladder section, forward of the lift cylinders, one (1) each side.

Two (2) FRC "So Brite" model SRA-07A series, 12VDC, LED scene light(s) shall be provided. The light(s) shall be mounted on appropriate mounting base(s) as required.

Light(s) shall include a white finish housing.

12VDC TIP LIGHT(S)

Two (2) 12VDC lights shall be mounted at the tip of the fly ladder section, one (1) each side. The lights shall be capable of swiveling 180 degrees and shall be mounted below handrail height, so as not to increase overall height of the vehicle.

Two (2) FRC "So Brite" model SRA-07A series, 12VDC, LED scene light(s) shall be provided. The light(s) shall be mounted on appropriate mounting base(s) as required.

Light(s) shall include a white finish housing.

TURNTABLE WORK LIGHTS

Five (5) TecNiq, model #E03-W000-1, LED turntable work lights shall be installed in the turntable step cover to illuminate the turntable area.

WALKWAY ILLUMINATION

The climbing area of the ladder shall be continuously illuminated utilizing a series of light emitting diodes (LED’s). The LEDs shall be located on both sides of each ladder section and shall be positioned near the ladder rails to maintain a clear walking area. A switch shall be provided on the turntable control console to activate the rung illumination lighting.

The LED lighting shall be Blue.

AERIAL 110 VAC WIRING

The AC wiring up the ladder shall be Thermoplastic Elastomer (TPE) control cables and shall be highly flexible with very fine copper stranding. The cables shall have a center core strain relief for high tensile strength. The conductors shall be braided in bundles around the high tensile strength core.

The outer jacket shall be gusset-filled, pressure-extruded, oil-resistant, bio-oil-resistant, PVC-free, halogen-free, and UV-resistant with low temperature flexibility. The cables shall have a minimum-bending radius of not greater than 5x the outer total diameter of the cable while moving.

One (1) 110 volt 20 amp electrical circuit utilizing a single 12 gauge 3 conductor electric cable shall be provided to the tip of the ladder. The circuit shall be wired from an enclosure below the turntable through the collector ring assembly.

OUTLET AT THE AERIAL TIP

A single 110 VAC outlet shall be provided at the tip of the aerial fly section, officer's side, as specified.

One (1) NEMA L5-20R, 120-volt, 3-wire, twist lock receptacle shall be installed. The receptacle shall have a 20-ampere rating and include a spring-loaded weather resistant cover if mounted in an exterior location. The receptacle shall be wired to the aerial 110VAC circuit.

AERIAL SPECIAL LABELS

Legible, permanent signs shall be installed in positions readily visible to the operator to provide operational directions, warnings, and cautions. The signs shall describe the function of each control and provide operating instructions.

Warning and caution signs shall indicate hazards inherent in the operation of the aerial device. These hazards shall include, but shall not be limited to:

Electrical hazards involved where the aerial device does not provide protection to the personnel from contact with, or near proximity to, an electrically charged conductor.

Electrical hazards involved where the aerial device does not provide protection to ground personnel who might contact the vehicle when in contact with energized electrically charged conductors.

Hazards from stabilizer motion.

Hazards that can result from failure to follow the manufacturer's operating instructions.

AERIAL DEVICE SPECIFICATION PLACARD

A permanent label shall disclose the following information relative to the aerial device:

Make

Model

Serial number

Date of manufacture

Rated capacity (s)

Rated vertical height

Rated horizontal reach

Maximum hydraulic system pressure

Hydraulic oil type and capacity

All other appropriate labels to ensure safe operation of the aerial device shall be permanently affixed in conspicuous locations.

APPARATUS LEVEL INDICATOR

Two (2) bubble type level indicator(s) shall be provided at the rear of the apparatus, visible to the operator setting the outriggers, to assist in the aerial device setup. The leveling indicator(s) shall be backlit, and color coded indicating the following conditions:

"Green" Safe Operating Zone.
"Yellow" Caution Operating Zone.
"Red" Do Not Operate Zone – Reposition Apparatus.

FORE/AFT LEVEL
An additional backlit leveling indicator shall be provided and installed to measure fore and aft level of the vehicle. The indicator shall be mounted near the left main outrigger control panel.

AERIAL SIGN PANELS

There shall be a total of two (2) Aerial sign panels provided and installed on the outside of the aerial base section, one (1) each side, for fire department lettering. Each sign panel shall have a lettering surface of approximately 13" wide x 120" long.

SIGN PANEL PAINT

The finished paint color shall be FLNA 32525 Red to match PPG 910853.

SPECIAL TOOLS

A toolbox shall be provided with the following special tools for checking the torque of specified bolts as recommended by the aerial manufacturer:

One (1) 1/2" drive, torque wrench
One (1) torque multiplier
One (1) ABR Backlash Adapter
One (1) Crimp Tool HDT-50-00
One (1) 1-1/8" x 6" torque wrench Weld
One (1) 3/4" drive 8" extension
One (1) 3/4" drive 13" extension
One (1) 3/4" drive 3/4" hex bit driver
One (1) 3/4" drive 1-1/8" standard depth socket
One (1) 3/4" drive 1-1/8" deepwell socket

One (1) 3/4" drive, 1-5/16" standard socket
One (1) toolbox TB11

AERIAL FILTER & LUBE SET

The following Filters and Lube shall be shipped loose to assist in maintenance of the aerial device as described by the manufacturer:

· One (1) Pressure Filter element
· One (1) Return Filter element
· Four (4) Tubes, Amsoil GPTR2CR grease
· One (1) Can, "Ultra Green" Wire Rope grease.

AXE MOUNTING

There shall be a mount provided and installed for a pick head axe in the fly section of the aerial. The axe mount shall include a receptacle that will cover the entire axe head and a PAC bracket to secure the axe handle.

The mounting location shall be on the same side of the aerial ladder as the control console.

PIKE POLE MOUNTING

There shall be one (1) mount(s) provided and installed in the fly section of the aerial for a pike pole. The mount shall include restraints for both ends of the pike pole.

The mounting location shall be on the same side of the aerial ladder as the control console.

ROOF LADDER MOUNT

Mounting brackets shall be installed on the outside of the aerial base section to store a single roof ladder. The mounting brackets shall be constructed from aluminum with a dual action sanded finish. The brackets shall be easily accessible from the inside of the ladder section or from the top of the body. The aerial sign plate (if specified) shall be mounted to the outside of the brackets.

The mounting location shall be on the opposite side of the aerial ladder as the control console.

ROOF LADDER MOUNT

The mounting brackets shall be designed and located to accommodate a 14' roof ladder.

FLY SECTION LOAD LIFTING/RAPPELLING EYES

The aerial device shall be equipped with two (2) load lifting/rappelling eyes at the tip of the fly section. The load lifting/rappelling eyes, as a pair, shall be rated not to exceed the tip load of the aerial device.

RESCUE ROPE ROLLER ASSEMBLY

The last rung of the aerial ladder shall be equipped with a removable rescue rope roller assembly. The assembly shall have a stainless steel shaft, dual tapered roller guide and two (2) pivoting lifting lugs. The assembly shall be rated at 500 lb. lift capacity.

REFLECTIVE STRIPING

There shall be a 4.00 inch (101.60 mm) inch reflective stripe with two (2) 1.00 inch (25.40 mm) accent stripes applied to the chassis and apparatus body as specified:

STRIPE PATTERN

The reflective striping shall be applied around the perimeter of the front of the apparatus in a straight line. In addition, when the stripe reaches the front area of the body, the stripe shall jog in a 'Z' shape pattern, then continuing around the rear of the apparatus at a slightly higher level.

STRIPE COLOR

The reflective striping shall be black in color.

REAR RETRO-REFLECTIVE CHEVRON STRIPING

A minimum of 50 percent of the rear-facing vertical surface, visible from the rear of the apparatus, shall be equipped with Diamond Grade, retro-reflective striping in a chevron pattern, sloping downward and away from the centerline of the vehicle at an angle of 45-degrees.

The stripe shall be 6.00 inches (152.40 mm) wide alternating in colors in compliance with (NFPA) 1901, Standard for Automotive Fire Apparatus.

CHEVRON COLOR

The retro-reflective chevron striping shall be red and fluorescent yellow green in color.

REFLECTIVE BODY/CAB LETTERING

Reflective letters shall be provided and installed on the apparatus as directed by the Fire Department. A maximum total of sixty (60) letters up to 3.00 inches (76.2 mm) high shall be provided.

AERIAL LETTERING

Reflective letters shall be provided and installed on each side of the aerial device base section. A maximum total of sixty (60) letters approximately 10.00 inches (254 mm) high shall be provided.

FIRE DEPARTMENT SUPPLIED DECALS

The apparatus decals shall be provided and installed by the Fire Department after final delivery of the completed apparatus.

LICENSE PLATE MOUNTING

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 of NFPA compliant Ziamatic folding wheel chocks model # SAC-44-E shall be supplied with the apparatus.

ZICO WHEEL CHOCK MOUNTING BRACKETS

One (1) set of Ziamatic folding wheel chock underbody horizontal mounts, model # SQCH-44-H, shall be installed on the apparatus under the body in front of the rear wheels on the right side.

RECHARGEABLE FLASHLIGHTS

All NFPA required portable hand lights will be supplied and installed by the Fire Department before the truck is placed into service.

LADDER BELTS

Gemtor Pompier Ladder/Escape life belt(s) model #531-540 with 18.00 inch extension shall be provided with the apparatus.

Each belt shall be made of nylon specially woven to meet the rigorous, texture and strength, intended for use as a positioning and emergency self-rescue device. Each belt shall be fitted with a double tongue buckle and Pompier hook enabling fast engagement and release.

The webbing shall have a minimum breaking strength of 9,000 pounds and an assembled capacity withstanding up to 2,000 pounds. There shall be a 3.00 inch wide buckle strap sewn with high tenacity nylon threads and a 5.00 inch wide riveted body strap.

The following shall be supplied:

One (1) #531-1 (Small) belt(s) with #540 extension.

One (1) #531-2 (Medium) belt(s) with #540 extension.

One (1) #531-3 (Large) belt(s) with #540 extension.

One (1) #531-4 (X-Large) belt(s) with #540 extension.

All remaining NFPA required equipment shall be supplied and installed by the Dealership before the truck is placed into service.