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**BID SPECIFICATIONS FOR 1 OR MORE CUSTOM PUMPER(S)**

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# GENERAL INFORMATION

The proposed apparatus will be constructed to withstand the severe and continuous use encountered during emergency firefighting services. The apparatus will be of the latest type, carefully designed and constructed with due consideration to the nature and distribution of the load to be sustained.

This proposal details the general design criteria of cab and chassis components, aerial device (if applicable), fire pump and related components (if applicable), water tank (if applicable), fire body, electrical components, painting, and equipment.

All items of these proposal specifications will conform to the fullest extent possible with the National Fire Protection Association Pamphlet No. 1901, latest edition, except as noted in the Statement-of-Exceptions.

The Bidder will furnish satisfactory evidence of our ability to construct, supply service parts and technical assistance for the apparatus specified.

Bids shall only be considered from companies that have an established reputation in the field of fire apparatus construction and have been in business for a minimum of 30 years.

Each bid must be accompanied by a set of detailed contractor's specifications consisting of a detailed description of the apparatus and equipment proposed.

All bid proposal specifications must be in the same sequence as the advertised specification for ease of comparison. These specifications shall include size, location, type, and model of all component parts being furnished. Detailed information shall be provided on the materials used to construct all facets of the apparatus body. Any bidder who fails to submit detailed construction specifications, or who photo copies and submits these specifications as their own construction details will be considered non-responsive and shall render their proposal ineligible for award.

Bids will be addressed and submitted in accordance with the instructions provided on the cover sheet. The words “**PUMPER BID**” shall be stated on the front of the sealed bid envelope.

It shall be the responsibility of the bidder to assure that their proposal arrives at the location and time indicated. Late proposals, telegrams, facsimile, or telephone bids will not be considered.

Bidders shall submit a detailed proposal. A letter only, even though written on a company letterhead, shall not be sufficient. Bid proposals shall be submitted in the same sequence as specifications for ease of evaluation, comparison and checking of compliance.

This will enable the District to easily compare all bids accurately. Failure to follow this format, provided for the convenience of the District, will render the vendor's proposal non-responsive and ineligible for award of contract.

Any questions regarding this specification must be submitted in writing and be received by Lieutenant Trevor Lenseigne a minimum of five (5) business days prior to the bid opening date. Clarifications, corrections and/or changes will be sent out in writing VIA fax or email to all prospective bidders. The District reserves the right to reject any and/or all bids, or accept any bid presented which meet or exceed these specifications and which the District may deem and shall be in the best interest of the District regardless of the amount proposed.

Contact information: Lieutenant Trevor Lenseigne 509-457-8615 – evfdtlenseigne@ycfd4.org

Any attempts to contact other fire district officials or board members will result in immediate

disqualification of the bid.

# 

# TABLE OF CONTENTS

To provide for ease of bid comparison and to clearly locate all proposed items, the District has provided a Table of Contents at the beginning of the proposed bid specifications. All Bidders shall include a table of contents with their bid for each Apparatus to be bid. For ease of bid comparison and evaluation for the Fire Department there shall be no exception to this requirement. Failure to comply with this requirement will render the bid as non-responsive and shall be rejected.

# 

# SPECIFICATION DOCMENT IN SAME SEQUENCE

For ease of cross referencing information from each bidder, the District requires that each bid

specification follows in this exact order. Failure to comply with this requirement will render the bid as non-responsive and shall be rejected.

# 

# EXCEPTIONS

The following apparatus specifications are considered minimum design and construction standards against which the apparatus will be inspected. It is the intent to receive proposals on equipment/apparatus meeting the attached detailed specifications in their entirety. Any proposals being submitted, without ''Full Compliance'' with these specifications shall so state on the bid proposal page, followed by a detailed ''Letter of Exceptions'' listing the areas of non-compliance. The reference must include page number, paragraph, and the exact nature of the exception.

Failure to follow this format, provided for the convenience of the District, will render the vendor's proposal non-responsive and ineligible for award of contract.

All exceptions regardless of how minor or major in nature shall be fully documented. All exceptions shall be cross referenced to the District’s specification as well as the bidder’s specification.

The District may add the statement ''No Exception'' to a component or design feature in these

specifications. In the interest of operational integrity, safety and customer requirement or specific performance requirements, the District will not permit exceptions taken to these item(s). The District reserves the right to reject any and/or all bid proposals and purchase the equipment it deems most suitable to its needs. The District does not, in any way, obligate itself to accept the lowest or any bid.

Any bidder taking total exception to the complete specification or a major element will result in immediate rejection of the proposal.

# EXCEPTION ORDER

All Exceptions shall be listed on a separate document. All exceptions shall be in the same order as these specifications. All exceptions shall reference the page number on this specification and cross reference to the specification submitted by the bidder.

Failure to comply with this requirement will render the bid as non-responsive and shall be rejected.

# 

# PROPRIETARY PARTS

Use of proprietary replacement parts is strictly forbidden. Failure to comply with this requirement will render the bid as non-responsive and shall be rejected.

# 

# AWARD CONSIDERATION

The bid will be awarded to the most "responsive bidder", provided that bid is in the best interest of the District. The District does not, in any way, obligate itself to accept the lowest bid.

When analyzing the bid proposals, and in recommending a successful bidder, service and warranty capabilities, service history, superior design, workmanship, materials, operating costs, location of factory, past experience, length of incorporation and compliance to specifications will be taken into consideration.

The District reserves the right to waive any formality in the bids received once such waiver is in the best interest of the District and, also, to accept any item in the bid found to be of superior quality or otherwise preferred by the District. In no way will the Fire District assume any liability for the contractor's negligence.

The District reserves the right to reject any and/or all bids, or except any bid presented which meet or exceed these specifications and which the District may deem and shall be in the best interest of the Department regardless of the amount proposed.

# NEW APPARATUS TRAINING

District personnel shall be properly instructed as to the proper use of the apparatus including, but not limited to, chassis, fire pump system, the apparatus and all equipment. Training shall be made by a factory trained specialist who shall be responsible for complete instruction as to operation and maintenance of the chassis, and the completed vehicle.

Training specialist shall remain at the District for a minimum of 3 days to provide thorough training of all personnel, or as instructed by Lieutenant Trevor Lenseigne. All meals, motel and travel costs shall be the responsibility of the successful bidder.

# 

# REJECTION OF BIDS

The competency and responsibility of bidders will be considered in making the award.

The District reserves the right to reject any and/or all bids when, in its sole judgment, such rejection is in the best interest of the District, and to reject the bid of a bidder who, in the judgment of the District, is not in a position to fulfill the contract.

The District does not obligate itself to accept the lowest or any bid. District has drawn up specifications to allow a competitive number of manufactures to bid. It is the desire of the District to get the safest, most practical application of a Pumper engine for the dollars.

The District reserves the right to waive any informality in bids received when such waiver is in the interest of the District; also, to accept any item in the bid, unless otherwise specified by the District or bidder.

Each bidder shall be prepared, if so requested by the District, to present specific evidence of its experience, qualifications, and financial ability to carry out the terms of the contract. The financial capability and customer service of the bidder will be seriously considered as part of the bid evaluation.

# 

# INSPECTION VISITS

The Bidder will provide two (2) factory inspection trips to The Bidder's facility. Transportation, meals, lodging, and other requisite expenses will be the bidder's responsibility.

Accommodations shall be for two (2) Fire Department representatives per trip.

The factory visits shall occur at the following stages of production of the apparatus:

* Pre-construction / blueprint review.
* Final inspection upon completion.

Travel arrangements greater than 300 miles from the manufacturing facility will be via commercial airline transportation.

The customer maintains the right to inspect the apparatus, within The Bidder's normal business hours. At any other point during construction expenses incurred during non-specified visits will be the responsibility of the customer.

During inspection visits, the customer reserves the right to conduct actual performance tests to evaluate completed portions of the unit. Testing will be accomplished with the assistance and resources of the contractor.

# 

# PRODUCT LIABILITY INSURANCE

The Bidder provides liability and facility insurance equaling $30,000,000.00, which is one of the highest available in the fire industry. Bidder shall provide documentation.

# 

# PAINT PERFORMANCE CERTIFICATION

The proposed The Bidder apparatus meets or exceeds the required Commercial Vehicle Paint Performance Standards.

# SERVICE CENTER AND PARTS DEPOT

The Bidder has an authorized service center, with a staff of factory-trained EVT Technicians well versed in all aspects of service for all major components, of the apparatus within a 25-mile radius of the Purchaser. In addition, the bidder will maintain a separate service facility, in order to satisfy the need for possible major emergency service work. No exceptions.

The following service facilities are required to be a responsive bidder. Notarized documentation of these facts shall be included in the bid packet with the Warranty and Service documentation.

* A minimum of $2,000,000.00 of OEM parts inventory shall be available at the local dealer and/or OEM satellite facility. Parts must be located in the Pacific Time zone – No Exceptions.
* Same day shipping and receiving to the Pacific Northwest airports must be provided – No Exceptions
* Dealer must have Service and Parts availability 24/7 365 days per year
* Dealer must state name and contact number of each service facility that can provide 24/7 service
* Dealer must state in miles the distance from the Purchaser to the nearest service and warranty facility **7** miles. Less than 25 miles is the minimum requirement. There shall be no exception to this requirement.

# PRICES AND PAYMENTS

The bid price shall include delivery to East Valley Fire Department in Yakima, WA, on a delivered and accepted basis at the Fire Department.

Total price on The Bidder's proposal sheet will include all items listed in these specifications.

The Bidder will compute pricing to include **all travel costs and include all applicable federal and state taxes.**

Any discounts shall be listed as optional and described in detail separate from the bid price**.**

**Discounts are not to be included in the bid price but listed a separate option for consideration.**

# FAIR, ETHICAL AND LEGAL COMPETITION

In order to ensure fair, ethical, and legal competition, neither original equipment manufacturer (O.E.M.) nor parent company of the O.E.M. will have ever been fined or convicted of price fixing, bid rigging, or collusion in any domestic or international fire apparatus market. There can be no exceptions to this requirement. Any exceptions will render the bid unresponsive and rejected for noncompliance and rejected as unresponsive.

# NON-COLLUSIVE BIDDING CERTIFICATION

By submission of this bid, The Bidder and each person signing on behalf of any bidder, certifies, and in the case of a joint bid, each party thereof certifies as to its own organization, under penalty of perjury, that to the best of their knowledge and belief:

* The prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for purpose of restricting competition, as to any matter relating to sell prices with any other bidder or any competitor.
* Unless otherwise required by law, the prices that have been quoted in this bid have not been knowingly disclosed by The Bidder and will not knowingly be disclosed by The Bidder prior to opening, directly or indirectly, to any other bidder or to any competitor
* No attempt has been made by The Bidder to induce any other person, partnership, or corporation to submit or not to submit a bid for the purpose of restricting competition.
* That all requirements of the law including amendatory provisions as to non-collusive bidding have been complied with.

# 

# MATERIAL AND WORKMANSHIP

All equipment furnished will be guaranteed to be new and of current manufacture, to meet all requirements of purchaser's specifications.

All workmanship will be of high quality and accomplished in a professional manner so as to insure a functional apparatus with a pleasing, aesthetic appearance.

# 

# SALES APPLICATION ENGINEER

The Bidder will designate an in-house individual to perform The Bidder's sales application functions. The contract specialist will provide a single point interface between the purchaser and The Bidder on all matters concerning the contract.

# 

# WASHINGTON STATE BUSINESS LICENSE

The Manufacturer’s authorized sales and service center shall be a licensed and bonded vehicle dealer for the State of Washington per Washington State R.C.W. codes. A Washington State Unified Business License (UBI) shall not be considered acceptable. Bidder shall include proof of such certificates in their bid proposal. If the bidder is manufacturer bidding direct and not through a dealer or distributor, then they shall submit a copy of the appropriate dealer’s license. Bids received from bidders and or manufacturers not licensed as a vehicle dealer within the State of Washington shall be rejected.

# 

# COOPERATIVE PURCHASING

The Washington State Inter-Local Cooperation Act, Ch. 39.34 RCW, authorizes public agencies to cooperatively purchase goods and services if all parties agree. By responding to this bid request, Proposers agree that other public agencies may purchase goods and services under this solicitation or contract at their own cost and without Yakima County Fire Protection District 4 incurring any financial or legal liability for such purchases. Yakima County Fire Protection District 4 agrees to allow other public agencies to purchase goods and services under this solicitation or contract, provided that Yakima County Fire Protection District 4 is not held financially or legally liable for purchases and that any public agency purchasing under such solicitation or contract file a copy of this invitation and such contract in accordance with RCW 39.34.040.

# PERMISSIVE COOPERATIVE PROCUREMENTS

Permissive Cooperative Procurements:  Other contracting agencies are allowed to establish contracts or price agreements under the terms, conditions, and prices of any contract resulting from this Request for Proposals.  Proposers shall agree to extend terms, conditions, and prices offered pursuant to this Request for Proposals to other contracting agencies, if awarded the contract.  Other contracting agencies interested in purchasing through a permissive cooperative procurement comply in all respects with other notice and contracting requirements as set forth in ORS 279A.200 to ORS 279A.225.

# 

# SOLE SOURCE MANUFACTURER

The Bidder is required to be a true "sole source" manufacturer.

“Sole Source” is defined as follows:

* Cab Skin, Cab Fame, Cab Weldments, and Cab finishing to all be designed, cut, welded and assembled in the same facility that the rest of apparatus will be built
* Cab Interior and Cab Doghouse to be designed, cut, welded and assembled in the same facility that the rest of the apparatus will be built
* Frame rails and cross members shall be bolted together and drilled for only those holes that are needed for this exact apparatus
* Frame rails and cross members, axles, pump shall be assembled and painted in the same facility that the cab, body and apparatus will be built
* Pump module will be designed, welded, assembled and installed at the same facility that the apparatus will be built

All work is done in The Bidder owned and operated manufacturing facilities by The Bidder direct employees. This capability provides consistent design and manufacturing procedures that will reduce warranty issues and provide ease in parts replacement.

Each bidder shall provide notarized documentation of the Sole Source requirements with their bid.

Failure to provide this documentation will render the bid as non-responsive and will be rejected. No Exceptions.

# 

# PRIMARY PLANT CONSTRUCTION

In order to insure top quality construction, maximum assembly line and engineering communication and the highest level of manufacturing supervision the entire apparatus will be built at The Bidder's (headquarters) manufacturing facility.

# INSTRUCTION MANUALS/DRAWINGS, SCHEMATIC

The Bidder will supply at time of delivery, two (2) CD copies of a complete operation and service manual covering the complete apparatus as delivered and accepted.

The manual will contain the following:

* Descriptions, specifications, and ratings of chassis, pump (if applicable), and aerial device.
* Wiring diagrams.
* Lubrication charts.
* Operating instructions for the chassis, any major components such as a pump and any auxiliary systems.
* Instructions regarding the frequency and procedures recommended for maintenance.
* Parts replacement information.

# 

# BID DRAWING

An 11” x 17” Detailed drawing of the exact apparatus being bid shall be included in the bid packet.

# 

# ISO 9001 QUALITY MANAGEMENT

The Bidder is certified ISO 9001 at all company locations. The Bidder received its certification from Eagle Registrations Inc. after they assessed the company’s quality system and found it to be in full compliance with ISO 9001. Eagle is accredited as a registrar by ANSI-ASQ National Accreditation Board (ANAB), the organization responsible for qualifying registrars as competent to audit and certify organizations conforming to ISO 9001 or other management system standards.

The International Organization for Standardization (ISO) is a worldwide federation of national standards bodies from 130 countries. Its ISO 9001 standard is a quality assurance model made up of 20 sets of quality system requirements. This model applies to organizations that design, develop, produce, install, and service products.

This business management system allows The Bidder to monitor processes to ensure they are effective; keep adequate records; check output for defects, with appropriate and corrective action where necessary; regularly review individual processes and the quality system itself for effectiveness; and facilitate continual improvement.

A copy of The Bidder’s certificate is included in this proposal. No Exceptions.

# INSTRUCTION MANUALS/DRAWINGS, SCHEMATIC

The Bidder will supply at time of delivery, two (2) CD copies of a complete operation and service manual covering the complete apparatus as delivered and accepted.

The manual will contain the following:

* Descriptions, specifications, and ratings of chassis, pump (if applicable), and aerial device.
* Wiring diagrams.
* Lubrication charts.
* Operating instructions for the chassis, any major components such as a pump and any auxiliary systems.
* Instructions regarding the frequency and procedures recommended for maintenance.
* Parts replacement information.

# "AS BUILT" WIRING SCHEMATICS

In accordance with standard commercial practices, The Bidder will supply two (2) copies of "AS BUILT" wiring schematics/diagrams for the entire vehicle at the time of delivery.

# 

# VEHICLE FLUIDS PLATE

As required by NFPA-1901, The Bidder will affix a permanent plate in the driver's compartment specifying the quantity and type of the following fluids used in the vehicle:

A permanent plate in the driving compartment will specify the quantity and type of the following

fluids used in the vehicle:

* Engine oil
* Engine coolant
* Chassis transmission fluid
* Pump transmission lubrication fluid
* Pump primer fluid
* Drive axle(s) lubrication fluid
* Air-conditioning refrigerant
* Air-conditioning lubrication oil
* Power steering fluid
* Cab tilt mechanism
* Transfer case fluid
* Equipment rack fluid
* Air compressor system lubricant
* Generator system lubricant
* Aerial systems

# U.S.A. MANUFACTURER

The entire apparatus will be assembled within the borders of the Continental United States to insure more readily available parts (without added costs and delays caused by tariffs and customs) and service. No exceptions to this requirement.

# AMP DRAW REPORT

The bidder shall provide with their bid proposal and at the time of delivery, an itemized print out of the expected amp draw of the entire vehicle's electrical system.

A written load analysis, which shall include the following:

* The rating of the alternator.
* The minimum continuous load of each component that is specified per: Applicable NFPA-1901.
* Additional loads that, when added to the minimum continuous load, determine the total connected load.
* Each individual intermittent load.

All of the above listed items shall be provided by the bidder per the applicable NFPA-1901.

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# UNDERWRITERS LABORATORIES INC. (UL) EXAMINATION AND TEST PROPOSAL

If required by the specific chapters of NFPA-1901, the proposed unit will be tested and certified for The Bidder Fire Apparatus by Underwriters Laboratories Inc. (UL) Underwriters Laboratories Inc. (UL) is recognized worldwide as a leading third-party product safety certification organization for over 100 years. UL has served on National Fire Protection Association (NFPA) technical committees for over thirty years.

# INDEPENDENT TESTING ORGANIZATION QUALIFICATIONS

* UL is a nationally recognized testing laboratory recognized by OSHA.
* UL complies with the American Society for Testing and Materials (ASTM) Standard ASTM E543 "Determining the Qualifications for Nondestructive Testing Agencies."
* UL has more than 40 years of automotive fire apparatus safety testing experience and 16 years of factory aerial device testing and Certification experience. UL has more than 100 years of experience developing and implementing product safety standards.
* UL does not represent, is not associated with, nor is in the manufacture or repair of automotive fire apparatus.
* All test work for fire pumps outlined in NFPA 1901, Edition will be conducted.
* UL has included a list of all factory aerial device manufacturers for whom testing is currently being conducted on a regular basis.
* UL carries ten million dollars in excess liability insurance for bodily injury and properly damage combined.

All work outlined in NFPA 1914, current Edition, including nondestructive testing, will be conducted at the manufacturer's facility.

The UL 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.

The actual person(s) performing the inspection will present for review proof of Level II Certification in the required NDT methods.

The Bidder will designate, in writing, who is qualified to witness and certify these test results.

Prior to submittal to the automotive fire apparatus manufacturer, the final Report will be reviewed by the Supervisor of Fire Equipment Services and a Registered Professional Engineer, both of whom are directly involved with the aerial device certification program at UL.

When the unit successfully meets all the requirements outlined in NFPA 1901, 2009 Edition, UL

shall issue a Certificate of Automotive Fire Apparatus Examination and Test stating the unit's compliance with NFPA- 1901.

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# GENERAL APPARATUS DESCRIPTION "PUMPER"

The unit shall be designed to conform fully to the "Pumper Fire Apparatus" requirements as stated in the NFPA 1901 Standard (2016 Revision), which shall include the following required chapters as stated in this revision:

* + Chapter 1 Administration
  + Chapter 2 Referenced Publications
  + Chapter 3 Definitions
  + Chapter 4 General Requirements
  + Chapter 5 Pumper Fire Apparatus
  + Chapter 12 Chassis and Vehicle Components
  + Chapter 13 Low Voltage Electrical Systems and Warning Devices
  + Chapter 14 Driving and Crew Areas
  + Chapter 15 Body, Compartments and Equipment Mounting
  + Chapter 16 Fire Pumps and Associated Equipment
  + Chapter 18 Water Tanks

# CAB SAFETY SIGNS

The following safety signs shall be provided in the cab:

* A label displaying the maximum number of personnel the vehicle is designed to carry shall be visible to the driver.
* “Occupants will be seated and belted when apparatus is in motion” signs shall be visible from each seat.
* “Do Not Move Apparatus When Light Is On” sign adjacent to the warning light indicating a hazard if the apparatus is moved (as described in subsequent section).
* A label displaying the height, length, and GVWR of the vehicle shall be visible to driver.
* This label shall indicate that the fire department will revise the dimension if vehicle height changes while vehicle is in service.

# CHASSIS DATA LABELS

The following information shall be on labels affixed to the vehicle:

Fluid Data

* Engine Oil
* Engine Coolant
* Chassis Transmission Fluid
* Pump Transmission Lubrication Fluid
* Pump Primer Fluid (if applicable)
* Drive Axle(s) Lubrication Fluid
* Air Conditioning Refrigerant
* Air Conditioning Lubrication Oil
* Power Steering Fluid
* Cab Tilt Mechanism Fluid
* Transfer Case Fluid (if applicable)
* Equipment Rack Fluid (if applicable)
* Air Compressor System Lubricant
* Generator System Lubricant (if applicable)
* Front Tire Cold Pressure
* Rear Tire Cold Pressure
* Aerial Hydraulic Fluid (if applicable)
* Maximum Tire Speed Rating

Chassis Data

* Chassis Manufacturer
* Production Number
* Year Built
* Month Manufactured
* Vehicle Identification Number

Manufacturers weight certification:

* Gross Vehicle (or Combination) Weight Rating (GVWR or GCWR)
* Gross Axle Weight Rating, Front
* Gross Axle Weight Rating, Rear

# ROLLOVER STABILITY

The apparatus shall meet the criteria defined in 4.13.1 for rollover stability as defined in the 2016 NFPA Standard for Automotive Fire Apparatus.

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# APPARATUS DIMENSIONS & G.V.W.R. (Bidder shall include dimensions in bid)

* OVERALL LENGTH: Not to exceed 396"
* OVERALL WIDTH: 100"
* OVERALL HEIGHT: Not to exceed 123"
* WHEELBASE: Not to exceed 199"

The axle and total weight ratings of the completed apparatus will not be less than the following minimum acceptable weight ratings:

* MINIMUM FRONT G.A.W.R.: 20,000 lbs.
* MINIMUM REAR G.A.W.R.: 24,000 lbs.
* MINIMUM TOTAL G.V.W.R.: 44,000 lbs.

The Bidder will include the principal dimensions, front G.A.W.R., rear G.A.W.R., and total G.V.W.R. of the proposed apparatus. Additionally, The Bidder will provide a weight distribution of the fully loaded, completed vehicle; this will include a filled water tank, specified hose load, miscellaneous equipment allowance in accordance with NFPA-1901 requirements, and an equivalent personnel load of 250 lbs. per seating position.

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# SEAT BELT ANCHOR TESTING

Each seat belt anchor shall be tested to withstand 3,000lbs of pull on both the lap and shoulder belt in accordance with FMVSS 210 section 4.2.

# SEAT MOUNTING TESTING

Each seat mounting position shall be tested to withstand 20G's of force in accordance with FMVSS 207 section 4.2(c).

Both tests shall be performed and verified at a third-party testing and evaluation center.

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# \*\*\*\* CUSTOM CAB AND CHASSIS \*\*\*\*

* **FULL TILT**
* **CONTOUR WINDSHIELD**

The cab shall be a custom tilt style, built specifically for fire service. The cab shall be a cab over engine design, with integral tilt mechanism and engine access from inside the cab.

Cab shall be designed, fabricated, assembled in its entirety, and installed on the frame rails in the manufacturer's factory. This requirement will eliminate any split responsibility in warranty and service.

# OPEN SPACE DESIGN

The cab interior shall be the "Open-Space" design with no wall, window or vertical support posts between the front and rear crew areas to allow direct communication, better visibility and air circulation in the cab.

# 

# CAB MATERIAL - ALUMINUM

The cab shall be fabricated from 5052-H 32 aluminum alloy, utilizing the minimum material thickness as follows:

* Cab side panels 0.125 thick (1/8")
* Cab roof 0.125 thick (1/8")
* Forward cab front sheet 0.125 thick (1/8")
* Interior cab panels 0.125 thick (1/8")
* Other panels 0.125 thick (1/8")
* Cab doors 0.1875 thick (3/16")
* Engine enclosure side panels 0.250 thick (1/4")

**Due to the safety requirements for the Fire Department as well as long term serviceability there shall be no exceptions to this requirement.**

# CAB - BASE CONSTRUCTION

Cab sub-frame shall be a welded assembly fabricated of 6063 structural aluminum alloys. This frame shall extend the full length and width of the cab and be secured to the chassis frame through two (2) rear urethane self-centering load cushions, two (2) forward pivot brackets, and two (2) cab locks. The cab shall be of entirely welded construction.

The front cab wall shall be of double wall type construction, featuring an inner and outer panel.

**Due to the safety requirements for the Fire Department as well as long term serviceability there shall be no exceptions to this requirement.**

# CRASH TESTING CERTIFICATION

To ensure the safety of the cab occupants and cab integrity, proof of third party testing shall be provided. The cab shall be certified for SAEJ2422 side impact, SAEJ2420 with ECER29 cab front impact, and ECER29 cab roof strength.

Furthermore, proof of testing and certification shall be provided that the cab, in accordance to SAE J2420 was front impact tested at 2.1 times the standard energy required in SAE J2420, thus exceeding the NFPA requirement.

This test shall be performed with no support immediately behind the cab, thus providing an authentic test result.

Due to the safety requirements for the Fire Department as well as long term serviceability there shall be no exceptions to this requirement.

# ROOF AND SIDE LOAD TESTING

The cab design will include additional third party testing to ensure the safety of the cab occupants and cab integrity, proof of third party testing shall be provided. The cab shall be certified for SAEJ2422 side impact, SAEJ2420 with ECER29 cab front impact, and ECER29 cab roof strength.

The manufacturer shall provide proof that third party testing has been conducted to prove a static roof and a static side-load test has been completed. In these tests, a 120,000-pound static load was first applied to the roof. This test was followed by applying the same 120,000-pound static load to the side of the cab.

These tests will be conducted per the SAE J2422, Cab Roof Strength Evaluation, protocol and the ECE R29, Uniform provisions concerning the approval of vehicles with regard to the protection of occupants of the cab of a commercial vehicle, protocol.

During both tests, the cab will withstand these loads without encroachment into the occupant survivable space and all doors remained closed during the test. The tests will be documented with photographs and real-time video in a report provided to the manufacturer.

Due to the safety requirements for the Fire Department as well as long term serviceability there shall be no exceptions to this requirement.

# LOAD TESTING DOCUMENTATION

Each responsive bidder shall include 3rd party documentation as to the results of their cab crash testing a loading result. Test results must include specific weight used for the testing and how many cab we utilized in the testing process.

Failure to provide this 3rd party documentation will result in their bid being rejected as non-responsive.

# MINIMUM CAB DIMENSIONS - FOUR DOOR STYLE CAB

Minimum Cab Dimensions:

* Overall width 100"
* Inside width across ceiling 92"
* Front area floor to ceiling 62"
* Crew seat area width 92"
* Outer crew seat risers to rear wall 42"
* Centerline front axle to back of cab 62-1/2"
* Centerline axle to front of cab 74”
* Top of front seat to ceiling 44" (depending upon seat type)
* Seat back to steering wheel 22" (depending upon seat type)
* Inside width (door to engine enclosure) 27" (driver's side, at floor)
* Inside width (door to engine enclosure) 24" (officer's side, at floor)
* Floor to top of engine enclosure 27
* Front cab floor to top of center dash 34-3/4"

Glass Area Dimensions:

* Windshield (Contour) 3,422 sq. in.
* Front door window, retractable 743 sq. in. each
* Rear door window, retractable 875 sq. in. each
* Fixed side windows 620 sq. in. each

Cab Entry Door Width Dimensions

* Forward door opening 40" wide
* Rear door opening 37" wide

Cab Entry Step Dimensions

* Forward door recessed step 32" wide x 9" deep
* Rear door recessed step 32" wide x 9" deep

Cab Entry Door Height Dimensions

* Forward door opening 76-1/4" high
* Rear door opening 85-1/4" high

**Any deviation or exceptions of material, dimensions or performance regardless of how minor must be clearly identified as an exception and explained on the exceptions page.**

# CAB ROOF

The roof will be of a split-level design with radius edges for an aesthetic, streamline appearance. The roof shall be constructed the same material as the main structure and shall be internally reinforced using framing which shall span the entire width and length of the cab for maximum structural integrity. This shall allow the roof to support personnel and roof mounted equipment without the need for additional reinforcement.

The cab roof over the rear crew area shall be raised ten (10) inches higher than the front driver and officer area. The front face of the raised roof section shall be sloped at a 45-degree angle, creating a streamlined interface with the standard, lower, forward roof section. This design shall allow for additional interior height in the rear crew area.

The rear crew area doors shall be "Vista-Style", extending full height to the radius edge of the raised roof.

Approximate dimensions:

* Crew area floor to ceiling 64"
* Top of crew seat to ceiling 46" (depending upon seat type)

There shall be no exceptions to the Cab roof dimensions and requirements

# CAB ROOF OVERLAY

A bright finish aluminum tread plate overlay shall be placed on the cab roof, starting at a point rearward of the light bar location and extending back to the end of the cab roof. This tread plate overlay shall be sealed with caulking around the edges to prevent moisture from entering the area between the cab roof and the overlay.

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# CAB ROOF DRIP RAIL

For enhanced protection from inclement weather, an integral drip rail shall be furnished on each side of the cab roof. The drip rail shall extend the full length of the cab roof.

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# STEPWELL BATTERY ACCESS DOORS

The battery access door(s) shall be 1/8" aluminum tread plate, drop down doors with thumb latches at each side rear cab step well.

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# CAB DOORS

Four (4) side-opening doors shall be provided. The cab doors shall be totally aluminum construction with an extruded aluminum frame and an aluminum outer door skin. Doors shall be full height from the step to the cab roof extrusion and enclose the step area when the doors are closed.

The forward cab door opening shall be a minimum of 40" wide, and the rear cab door opening shall be a minimum of 37" wide.

The rearward cab doors shall have a radius cutout allowing the door opening to protrude forward over the cab wheel well, while providing full access to the rear crew area.

There shall be a heavy duty piano type stainless steel hinge on each door with a minimum pin diameter of 5/16". Hinges shall be slotted for ease of horizontal and vertical adjustment. There shall be a cab door seal and the doors shall close flush with the side of the cab. A heavy-duty 6" wide belting material shall be utilized to prevent the cab doors from opening greater than 90 degrees.

**There shall be no exception to this requirement due to the overall safety concerns for Firefighter ingress and egress.**

# ENTRY STEP AREA

Each of the forward entrance steps shall be a minimum of 8-1/2" deep with the floor board recessed a minimum of 5" to avoid "shin knocking". Each step shall be a bolt-in cast aluminum step.

Each of the rear entrance steps shall be a minimum of 8-1/2" deep. An intermediate step shall be provided between the lower entrance step and the crew area floor for ease of entry and egress. Each step shall be fabricated as an integral part of the cab construction. The cab step risers shall be painted to match the cab exterior color.

Each lower step shall be a bolt-in cast aluminum step.

**There shall be no exception to this requirement due to the overall safety concerns for Firefighter ingress and egress.**

# ENTRY STEP AREA REQUIREMENT

Each of the forward entrance steps shall be a minimum of 8-1/2" deep with the floor board recessed a minimum of 5" to avoid "shin knocking". Each step shall be a bolt-in cast aluminum step. The cab steps risers shall be overlaid with bright finish aluminum tread plate.

The front entry positions will require no more than one (1) step to access the front of cab from the ground – There shall be no exception to this requirement due to the overall safety concerns for Firefighter ingress and egress

Each of the rear entrance steps shall be a minimum of 8-1/2" deep. An intermediate step shall be provided between the lower entrance step and the crew area floor for ease of entry and egress. Each upper section of the steps and respective step risers shall be constructed as an integral part of the cab construction and shall be overlaid with bright finish aluminum tread plate. Each lower step shall be a bolt-in cast aluminum step.

The rear entry positions will require no more than two (2) steps to access the rear of cab from the ground.

**There shall be no exception to this requirement due to the overall safety concerns for Firefighter ingress and egress.**

# DOOR LATCHES

A semi-recessed chrome plated pull handle, capable of operating with a gloved hand, shall be provided on the exterior of each cab door. Heavy-duty, bright finish cast paddle latches shall be provided on the interior of each cab door. Door latch mechanisms which utilize spring steel clamps shall not be considered due to their tendency to both rust and break. The interior door latch cables are to be designed to reduce adjustment or possible wear at the adjustment turnbuckles.

# 

# LOCKING CAB DOORS

Each exterior cab door shall be equipped with keyed locks. The cab doors shall be capable of being locked from the outside with a key and from the inside with a control in each interior paddle latch.

The specified door lock cylinder/s shall be equipped with #2001 key/s.

# 

# ELECTRIC WINDOWS

Each side cab door shall have a tinted retractable window, the window track shall be designed into the door frame extrusion, which shall be extruded with a track groove to house a window track and seal. The window shall be capable of being removed from an access slot designed in the bottom of the door frame.

All side cab doors shall be equipped with electrically operated windows.

Power window controls shall be provided either on the door panel or dash panel depending on the cab and interior trim configuration.

The control for each rear door shall be a rocker type automotive style switch located on the inside door panel within easy reach.

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# DOOR WINDOW TRIM

Each side cab door window shall be designed with a custom extruded trim plate, which shall conform to the perimeter of the window opening in each door. The trim plate shall extend from the edge of the door skin to the window and shall have a silver anodized finish.

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# CAB DOOR WINDOW SILL PROTECTION

Brushed stainless steel protection caps shall be provided on each door interior window sill. The caps shall be fabricated from 18-gauge brushed stainless steel and cover from the window edge down over the sill and meet the inner door panel top edge.

# 

# INNER DOOR PANELS

The cab door interior panels shall be covered with an aluminum panel, full height. The panel shall be 1/8" aluminum and painted with Line-X and shall be designed to allow easy access to the inner door.

The Line-X shall be dark gray in color.

The inner door panel shall be designed as a three (3) piece panel to allow easy access to the door latching mechanism, electrical components or the window mechanism without disassembling the entire door.

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# DOOR WARNING - CHEVRON

Four (4) Chevron reflective signs shall be installed on the lowest portion of the inner door panels, one (1) on each door. These chevrons shall cover at least 96 in². The chevrons shall be applied to an aluminum plate that shall be fastened to the door panel.

# 

# EXTERIOR CAB WALL OVERLAY

A bright finish aluminum tread plate overlay shall be provided over the entire exterior rear cab wall. The tread plate overlay shall be sealed with caulking around the edges to prevent moisture from getting between the cab and the overlay.

# 

# WINDSHIELD/GLASS

A two piece, symmetrical, safety glass windshield shall be provided on the cab for the driver and officer providing a clear viewing area. The windshields shall be full width to the center of the front cab support for each side and provide the occupants with a panoramic view. To provide enhanced peripheral vision on each side of the cab, the windshield and cab structure shall be designed with radius corners, which provide a minimum of 8" of glass area, measured from the glass face to the side edge near the door post. The windshield shall consist of three (3) layers; the outer light, the middle safety laminate and the inner light. The thick outer light layer shall provide superior chip resistance, the middle safety laminate layer shall prevent the windshield glass pieces from detaching in the event of breakage and the inner light shall provide yet another chip resistant layer.

The windshield will be a contour design with 3422 sq. in. of area for improved visibility and style. The windshield glass shall be designed so it can be used on either the driver or officer side. Single piece windshields that utilize epoxy or that are bonded to the cab structure shall not be acceptable.

Windshield glass must be available commercially. The left and right-side glass shall be interchangeable for ease of replacement. There shall be no proprietary parts for this apparatus. No exceptions.

# WINDSHIELD WIPERS AND WASHER

Dual, electric operated, pantographic type windshield wipers shall be provided. One (1) electric drive motor shall be provided for each wiper.

Wipers shall have "HI/LO" and "INTERMITTENT" operating speeds. "HI/LO" speeds shall be controlled by a steering column control, within the turn signal control stem. "INTERMITTENT" operation shall be controlled by a twist switch within the control on the steering column. The wipers shall be of the self-parking type.

Windshield washers shall be electric operated wet-arm type with a 3/4-gallon washer fluid reservoir, mounted inside the engine enclosure and readily accessible through the engine hatch at the rear of the engine enclosure. The washer control shall be integral with the intermittent wiper control switch.

There shall be individual removable panels on the front face of the cab for access to the wiper motor assemblies.

# WINDSHIELD WIPER DURABILITY CERTIFICATION

Windshield wipers shall survive testing in excess of 3 million cycles in accordance with section 6.2 of SAE J198 “Windshield Wiper Systems – Trucks, Buses and Multipurpose Vehicles”. The bidder shall certify that the wiper system design has been “Third party tested” and that the wiper system has met these criteria.

# CAB SIDE VIEWING WINDOWS

A fixed, tinted window with 620 sq. in of glass area shall be provided on each side of the cab behind the forward cab doors. This window will be the same height as the window in the rear cab door for maximum visibility.

# STATIONARY VIEWING WINDOWS

Two (2) 22"H x 9"W stationary viewing windows shall be provided on the rear wall of the cab, one (1) each side, at the outboard edge. Each window shall be installed with an aluminum flange.

# DARK TINTED REAR WINDOW GLASS

The windshield and the forward cab door glass shall be provided with standard DOT green automotive tint. The side cab windows to the rear of the front doors, the rear cab door windows and any rear viewing windows shall be equipped with a dark automotive tint.

# GRAB HANDLES

Four (4) 1-1/4" diameter x 28" long, knurled bright anodized aluminum handrails shall be provided, one (1) at each cab door entrance. Grab rail stanchions shall be chrome plated and offset when necessary to prevent "hand-pinching" when opening or closing the doors. Formed rubber gaskets shall be provided between each stanchion base and the cab surface.

# INTERIOR GRAB RAILS

Grab rails shall be provided to assist in entry and exiting of the cab. Each grab rail shall be a cast aluminum "D" style handle that shall have a wheelabrated finish and shall be located in the following locations:

* One (1) 11" long, horizontally mounted, on each front cab door on the upper interior door panel
  + - One (1) 12" long, vertically mounted, on the officer's side "A" post
    - One (1) 11" long, horizontally mounted, on each rear cab door on the interior door panel
    - One (1) 30" long, horizontally mounted, on each rear cab door, located approximately 8" above the bottom of the window opening
* Three (3) 12" long, vertically mounted, one (1) on the driver's side cab interior on the “A” post and one (1) each side of the cab interior on the “C” post in the crew area

# STAINLESS STEEL FRONT CAB GRILL

There shall be a mirror finished stainless steel, custom formed grille assembly for maximum air flow to the charge air cooler and the radiator. The grille shall be designed with an aesthetic look, with large horizontal louvers that will be reinforced to provide integrity.

The grill shall be a modular design to allow the sides or the individual louvers to be replaced if damaged.

An American flag mesh bug screen shall be provided behind the front grill assembly to protect the radiator from bugs and other debris. The screen shall be secured to the front of the cab by button snaps, behind the main grill.

# AIR INTAKE/OUTLET

Two (2) shaped, mirror finished stainless steel air inlets/outlets shall be provided horizontally above the wheel well opening, one on each side of the cab. The grilles shall be equipped with a mesh screen to serve as a secondary ember separator. The design shall permit proper ducting of air through the engine compartment and cooling system.

There shall be no exception to the location of the inlets/outlets requirement due to the overall concerns for Firefighter safety.

# ENGINE AIR INTAKE SYSTEM

The left side inlet, used for the air intake to the air cleaner, shall be equipped with dual ember separators for separating burning embers from the air intake system. This system shall be such that particles larger than .039 inches (1 mm) in diameter cannot reach the air filter element.

No part of the air intake system for the engine shall be lower than the top of the frame rails to ensure the vehicle can navigate pooled water without any part of the air intake system being exposed to water when the vehicle is stopped or in motion. Chassis designs, which the engine air intake system is lower than the frame rails shall not be acceptable!

There shall be no exception to the location of the Engine air inlet / ember separator requirement due to the overall concerns for Firefighter safety.

# CAB WHEEL WELL LINERS

The front cab wheel wells shall be equipped with fully removable, bolt-in, aluminum inner wheel well liners. The liners shall extend full depth into the truck frame. The completely washable wheel well liners shall be designed to protect the cab substructure, inner panels, and other miscellaneous installed components from road salts, debris, dirt accumulation and corrosion.

# 

# CAB FENDERETTES

The cab wheel well openings shall be trimmed with replaceable, bolt-in, molded black rubber fenderettes. The fenderettes shall be secured to the cab with stainless steel threaded fasteners along the internal perimeter of the wheel well. Rubber welting shall be installed between the fenderettes and the cab side panel.

# FRONT MUD FLAPS

Heavy duty, black rubber type mud flaps shall be provided behind the front wheels.

# FOLD STEPS REAR CAB WALL

A folding step shall be provided on the exterior rear wall of the cab, on the driver and officer side, to provide easy access to the pump house walkway. The steps shall mount approximately 13" from the bottom of the rear cab sheet and centered 6" from the outer edge of the cab. The step shall match the folding steps utilized on the apparatus body.

# CAB RADIUS MOUNTED MIRROR

Two (2) Ramco model 6001 FFHR-750HR polished aluminum, full face, heated, remote operated, 13 inches high X 9 3/4 wide mirrors, with a 750-top add-on heated / remote convex mirror, on a standard arm length of 15 inches shall be provided and installed. The flat glass and top mirror head shall be remote operated. The mirror head shall be attached to a polished aluminum arm mounted on the cab radius panel.

# 

# MIRROR CONTROL/S

To minimize wire circuits roughed from the dash to the door, the mirror position and heat (if applicable) controls shall be programmed into and controlled from the multiplex control screen.

# INTERIOR TRIM

The cab interior shall be constructed to create an ergonomically designed interior to be user friendly and functional for the driver and officer.

The forward overhead panel shall be a fabricated aluminum module painted to match the interior.  This module shall contain the integrated windshield defroster/heater.

The headliner and rear cab wall shall utilize gray Durawear material, with padding underneath, to provide additional insulation.

The interior metal surfaces of the cab shall be finish painted with dark gray Line-X material.

# INTERIOR REAR WALL

The interior rear wall of the cab shall be covered with gray Durawear for durability and shall match the other upholstered areas of the cab.

A twelve (12) inch high smooth aluminum scuff plate shall be provided on the lower portion of the rear interior cab wall. The scuff plate shall be finish painted with Line X to match the cab interior.

# UNDER SEAT STORAGE COMPARTMENTS

There shall be a compartment provided under each front seat. Each compartment shall be accessible from the front of the seat riser when the door is opened.

# BARYFOL FLOORING

The floor of the driver’s compartment and the floor of the crew area shall be lined with BARYFOL vinyl composite flooring to comply with NFPA noise and heat requirements.

# CAB ACOUSTICAL INSULATION

One (1) inch thick acoustical insulation shall be provided on the cab roof and rear and side walls of the cab. This material shall be fitted between the cab structural members and secured with adhesive to provide an insulation barrier for noise and heat.

# CAB FLOOR COVERING

The floor of the driver's, officer's area and the floor of the crew area shall be covered with bright finish aluminum tread plate over the standard floor covering. No exceptions.

# ENGINE ENCLOSURE

The forward portion of the engine enclosure shall be covered with a Durawear material formed overlay to match the balance of the cab interior. To allow maximum "elbow room" for the driver and officer, the forward portion of the engine enclosure shall feature a contour shape. The engine enclosure shall not significantly obstruct the driver's vision in any direction. The enclosure shall be an integral part of the cab structure, which shall be constructed from material providing adequate strength to support radio, map boxes, etc. The engine enclosure shall be insulated to protect from heat and sound. The noise insulation shall keep the DBA level within the limits stated in the current NFPA series 1901 pamphlet.

A padded, hinged access door shall be provided in the top rearward portion of the engine enclosure. The door shall allow access to the engine oil, transmission fluid, power steering fluid level dipsticks and the windshield washer fluid reservoir. The access door shall be provided with two (2) flush mounted latches and gas shock holders. There shall be a Durawear material cover over the access door to give a cleaner look to the top of the engine enclosure and doghouse area.

The enclosure shall be an integral part of the cab structure, which shall be constructed from a minimum of .25" 5052-H32 aluminum. This material shall be welded to the floor sub frame on each side of the cab and shall extend from the very front of the cab to the rear of the engine enclosure.

The rear section of the engine enclosure shall be reduced 8-1/2" in length to provide additional leg room for the forward-facing seating position/s.

# ENGINE ENCLOSURE OVERLAY PANELS - LINE X

The engine enclosure Durawear layer shall be overlaid with formed aluminum panels which shall be coated with Line-X to provide a rugged surface for this high wear area. The Line X panels shall be finish painted to match the cab interior painted surfaces.

# DURAWEAR ARM/ELBOW PADS

The driver's and officer's side of the Line-X coated doghouse shall have a removable dark gray Durawear arm/elbow rub pad for added comfort against the coating. The pads shall be capable of being removed for cleaning or replaced due to wear.

# ADDITIONAL ENGINE ENCLOSURE INSULATION

Premium soundproofing/insulation material, Barymat BTRLAX3-14BY shall be installed in the engine enclosure. To ensure a clean, smooth surface, this material shall be retained by flat aluminum panels fastened to studs that are welded to cab as needed. These panels shall be removable. Any gaps in this insulation barrier shall be sealed with 3M #425 aluminized high temperature tape.

# ENGINE ENCLOSURE MOUNTING PANEL

A 3/16" thick brushed aluminum panel with 1" radius corners shall be provided and installed in the center - forward area of the engine enclosure. The panel shall be approximately 17" wide x 14" long and to include four (4) 1" high spacers raising the panel above the enclosure outline.

# SUN VISORS

To provide maximum protection for the driver and officer, two (2) padded vinyl sun visors shall be mounted in the cab overhead on each side.

# \*\*\*\*\* CAB SEATING & ACCESSORIES \*\*\*\*\*

# DRIVERS SEAT

The driver's seat shall be a USSC Valor 8-way electric ABTS LH bucket seat. The seat shall have a contoured and padded seat cushion with adjustable lumbar support. The seat shall have a horizontal slide adjustment, a vertical height adjustment, and tilt adjustment. All seat movements shall be electrically controlled from panel on the forward lower edge of the seat.

The seat shall be equipped with a red integrated 3-point shoulder harness with lap belt, and a dual retractor belt configuration with ready reach built into the seat assembly.

# OFFICERS SEAT

The officer's seat shall be a USSC Valor ABTS RH,18" width, air-suspension, SCBA seat. The seat shall be equipped with magnetic SCBA strap holders which secure the SCBA straps. The seat shall have a contoured and padded seat cushion with a dynamic SCBA back frame that adjusts rearward with each occupant to properly seat them against the bolster and headrest.

The seat shall have a horizontal slide adjustment, and vertical height adjustment with adjustable back. The seat air suspension shall be pneumatically controlled from a switch on the forward lower edge of the seat. Limiting straps shall be provided as a standard feature to allow the adjustment of the dynamic back.

The seat shall be equipped with a red integrated 3-point shoulder harness with lap belt, and a dual retractor belt configuration with ready reach built into the seat assembly.

The seat shall include a SmartDock Gen II bottle bracket.

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# USSC - HORIZONTAL SLIDE ADJUSTMENT - OFFICERS SEAT

The officers seat shall be equipped with a horizontal slide adjustment six (6) inches on center.

# FORWARD FACING, OUTBOARD, DRIVER SIDE SEAT

The driver's side outboard forward-facing crew seat shall be a USSC Valor ABTS LH series fixed base SCBA seat. The seat shall have a contoured and padded seat cushion with a standard SCBA back. The seat shall be equipped with magnetic SCBA strap holders which secure the SCBA straps.

The seat shall be equipped with a red integrated 3-point shoulder harness with lap belt, and a dual retractor belt configuration with ready reach built into the seat assembly.

The driver's side outboard forward-facing crew seat shall have a flip-up style seat.

The seat shall include a SmartDock GenII bottle bracket.

# CENTER FORWARD FACING CREW SEATS

Two (2) center inboard forward-facing crew seats shall be provided. Each seat shall be a USSC Valor ABTS series SCBA seat. The seats shall have a contoured and padded seat cushion with a dynamic SCBA back frame that adjusts rearward with each occupant to properly seat them against the bolster and headrest. The seats shall be equipped with magnetic SCBA strap holders which secure the SCBA straps. Limiting straps shall be provided as a standard feature to allow the adjustment of the dynamic back.

The seats shall be equipped with a red integrated 3-point shoulder harness with lap belt, and a dual retractor belt configuration with ready reach built into the seat assembly.

The two (2) center inboard forward-facing crew seats shall have standard seat.

Each seat shall include a SmartDock GenII bottle bracket.

# FORWARD FACING CREW SEAT RISER

The center forward facing seats shall be mounted on an aluminum riser that shall be mounted in the center of the cab. The riser shall match the interior of the cab and shall have individual, painted compartment doors with latches to provide additional storage space in the cab.

# SEAT UPHOLSTERY MATERIAL

The seats shall be upholstered with Black Cordura material with red top stitching as provided by USSC.

All seating shall have "quick removal" covers.

# USSC PARADE PACKAGE PADDED SCBA OPENING COVERS

Four (4) removable padded covers shall be provided for the SCBA seat openings.

# SEAT ADJUSTMENT NOTICE

If equipped, adjustable seats may be limited by outside factors such as optional installed equipment (i.e. ems compartments, battery chargers, scba cylinder brackets) and seat placement.

# SEAT BELT CUSHION SENSORS AND BELT SENSORS

The apparatus shall be equipped with a Class 1 seat belt warning system. The system shall consist of a Seat Belt module and shall display the seating positions through the main UltraView screen.

Seat belt and seat cushion sensors shall be provided on the five (5) specified seating positions.

# VEHICLE DATA RECORDER

A Class 1 Vehicle Data Recorder (VDR) system shall be provided. The system shall include an NFPA compliant "Black Box" with reporting software that shall be capable of data storage to coincide with the NFPA requirements.

Data storage capabilities shall include interfaces with the following systems:

* Display module (Master Optical Warning Device)
  + - VDR, date & time stamp
    - Max Vehicle speed (MPH)
    - Vehicle acceleration / deceleration (MPH/Sec.)
    - Engine Speed (RPM)
    - ABS event
    - Data password protected
    - Data sampled once per second, in 48-hour loop
    - Data sampled min by min for 100 engine hours
    - Throttle position (% of Throttle)
    - Data software
    - PC / Mac Compatible
    - Data summary reports

The VDR data shall be downloadable by USB cable to a computer using either Microsoft or Apple operating systems.

# EXTERNAL CAB STORAGE COMPARTMENT WITH HINGED DOOR + INTERNAL ACCESS DOOR

A storage compartment shall be mounted in the cab in lieu of the driver's side rearward facing crew seat. The compartment shall be approximately 23 7/8" deep x 41 3/4 " high x 22 3/4" wide. The door opening shall be approximately 35 7/8" high x 20" wide.

The compartment shall be constructed of aluminum, painted with textured paint matching the interior color of the cab and shall be equipped with a hinged flush mount door on the exterior and an internal access door, latched and painted. The exterior door shall be held in the open position by a gas shock stay arm.

The interior of the compartments shall be finish painted job color with a scuff resistant webbing type paint of a contrasting color applied over the painted surfaces.

The EMS compartment shall be equipped with one (1) Amdor LED interior light(s). The lighting shall be wired to automatically activate when the compartment door is open, and the master battery switch is in the "on" position.

The driver’s side EMS compartment shall be equipped with a Blue Sea 5025 power point with power and ground connections conveniently positioned in the upper area inside the compartment, connected directly to the chassis batteries.

One (1) adjustable shelf(s) shall be provided in the EMS compartment. The shelf(s) shall be constructed from 3/16" brush aluminum mounted to uni-strut tracking material.

# EXTERNAL CAB STORAGE COMPARTMENT WITH A HINGED DOOR + INTERNAL ACCESS DOOR

A storage compartment shall be mounted in the cab in lieu of the officer's side rearward facing crew seat. The compartment shall be approximately 23 7/8" deep x 41 3/4" high x 22 3/4" wide. The door opening shall be approximately 35 7/8" high x 20" wide.

The compartment shall be constructed of aluminum, painted with textured paint matching the interior color of the cab and shall be equipped with a hinged flush mount door on the exterior with a painted finish and an internal access door, latched and painted. The exterior door shall be held in the open position by a gas shock stay arm.

The interior of the compartments shall be finish painted job color with a scuff resistant webbing type paint of a contrasting color applied over the painted surfaces.

The EMS compartment shall be equipped with one (1) Amdor LED interior light(s). The lighting shall be wired to automatically activate when the compartment door is open, and the master battery switch is in the "on" position.

The officers side EMS compartment shall be equipped with a Blue Sea 5025 power point with power and ground connections conveniently positioned in the upper area inside the compartment, connected directly to the chassis batteries.

One (1) adjustable shelf(s) shall be provided in the EMS compartment. The shelf(s) shall be constructed from 3/16" brush aluminum mounted to uni-strut tracking material.

# CAB DOGHOUSE STORAGE MODULE

A storage module shall be installed on the center doghouse area between the driver and officer. The module shall be constructed of 1/8" aluminum and shall be painted with a scuff resistant paint to match the cab interior. The module shall include two (2) cup holders, a pen tray, a flat open storage area for notebooks, six (6) divided storage areas for 3-ring binders, and four (4) slide in storage area's two (2) accessible from each side of the cab.

# ANTENNA INSTALLATION

Two (2) antenna mounting base(s) model #MATM with 17' of coaxial cable shall be provided and installed on the lower cab roof, behind the light bar. The attached antenna wire(s) shall be run to the right-side cab dash area.

The Fire Department is responsible to have the correct antenna whip installed once the apparatus is delivered.

# LAPTOP COMPUTER SLIDE OUT TRAY

A slide out tray shall be installed for the officer to provide an area for laptop computer usage. In the closed position this area will be nest forward to allow access in and out of the vehicle.

# DRINK HOLDER - DRIVER AND OFFICER

A single drink holder shall be installed on each side of the engine enclosure, convenient to the driver and the officer.

# DRINK HOLDER - DRIVER AND OFFICER

Two (2) single drink holder(s) shall be installed on the rear of the engine enclosure, convenient to the crew

# \*\*\*\*\* CAB INSTRUMENTATION & CONTROLS \*\*\*\*\*

# DASH & CENTER CONSOLE

The dash shall be a custom formed, Line-X aluminum housing to create an ergonomically designed interior that will be user friendly and functional for the driver and officer.

The instrument cluster shall be centered in front of the driver and all gauges shall be installed in a non-glare, pewter finish panel.

All warning lights and indicators shall be located in either the gauge itself or in the lower center portion. Each gauge shall be equipped with an international symbol that is easily recognizable; denoting the system being monitored. Instrumentation shall be backlit for easy identification when activated.

The transmission gear selector shall be located on the left side of the center dash assembly, toward the driver for easy access.

# DRIVER'S DASHBOARD PANEL

The main instrument panel shall be centered in front of the driver and shall have a hinged bottom with two ¼ turn latches at the top. The panel shall be made of 1/8” aluminum with an anti-glare, pewter brushed surface and shall contain the primary gauges, an instrument warning light cluster and the ignition and engine start switches.

The lower portion of this panel can be used for the installation of up to five (5) guarded type rocker switches. Examples of the switches that shall be installed in this area are automatic chains, fan clutch over-ride, ATC mud-snow, inter-axle diff lock, electric fuel pump, all-wheel drive, etc.

The main instrument panel shall contain the primary gauges. An ignition and engine start switch shall be located on a panel to the left upper portion of the driver's side dash panel.

Each gauge shall have a raised glass lens with a black matte finish trim ring and be backlit by integral white LEDs. Each gauge shall also possess an integral red warning light with a pre-programmed warning point. Each gauge warning indicator shall be capable of activating an audible alarm inside the dashboard.

The primary gauges shall consist of:

* + - Vehicle speedometer, (0-80 mph)
    - Engine tachometer, (0-3000 rpm)
    - Engine oil pressure, (0-100 psi); low oil warning
    - Engine coolant temperature (100-280 °F); high engine temp warning
    - Transmission oil temperature (100-350 °F); high transmission fluid temp warning
    - Vehicle battery voltage (9-18 VDC); low voltage warning
    - Front air system gauge (0-150 psi); low air pressure warning at 65 psi
    - Rear air system gauge (0-150 psi); low oil pressure warning at 65 psi
    - Fuel level (E - 1/2 - F); low fuel level warning
    - Air cleaner restriction gauge (0-40), warning at 25"

Additional auxiliary control switches and instruments (if applicable) shall be located within the dash panel and overhead panel located near the driver's position.

* Diesel Exhaust Fluid level (E-1/2-F); low fuel level warning @ 1/8 tank
* Engine Compression Brake Controls

Any deviation or exceptions of material, dimensions or performance must be clearly identified as an exception and explained on the exceptions page.

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# CLASS 1 ULTRAVIEW DISPLAY

An UltraView 700 7" display shall be provided on the dash for the electrical Class One ES-Key multiplex system. The exact location shall be determined by the totality of instruments and switches on the cab dash.

# ADDITIONAL CLASS 1 ULTRAVIEW 700 ON OFFICER SIDE OF CAB

An additional Class 1 UltraView 700 7" display shall be recessed mounted on the officer side of the cab. The second display shall have the ability to perform and display all the same functions and information of the main display located on the driver side of the cab.

# INDICATOR CLUSTER

The driver's dashboard panel shall consist of Ametek gauges, an 18-item instrument warning light cluster and a 16 item, dead front type alarm panel.

This display shall contain the system control unit that collects data from the vehicle data bus (J1939), analog sensors, and switches throughout the vehicle. This data shall be presented using gauges, telltales and the two (2) display panels. The warning light display shall include a 2 x 20 dot matrix display, 18 telltales and 2 buttons to navigate through the screen menus.

The LCD dot matrix display shall be a 2 line by 20-character display with each character being 7 dot by 5 dot configuration. FSTN technology shall be used on the display for wide viewing capability. The module shall be backlit with amber LEDs. The unit shall also be supplied with a heater to ensure proper operation over the entire 40 to +85 deg. C.

This display contains a series of two (2) screens to provide information about the vehicle. To control the display of that information, the screens are divided into two (2) menus; one that can be displayed while the vehicle is in motion and one that can only be accessed when the parking brake is set.

On the Road displays include:

* Two (2) configurable displays that can show any of the parameters the unit collects. This includes odometer, trip information, fuel economy information; all gauge data, and virtually any other data available on the vehicle that the display has access to, either through the data bus or via analog inputs.
  + - Two (2) trip displays for miles and hours that are capable of being reset.
    - Two (2) fuel data screens: shall be provided; one for fuel remaining until empty and one for fuel economy. The fuel economy display shall be capable of being reset so that average economy over a predetermined period can be displayed.

The displays that can be accessed when the parking brake is set include:

* + - Engine hours as maintained by the engine ECU
    - Service Alarm screens to report miles to next service or miles past required service. These screens shall allow the operator to choose the length of the service interval and shall have the ability to reset it.
    - Message screens with warning messages the display has collected during the current ignition cycle. These screens shall be divided into configured warnings such as “Low Air Pressure” and the data bus faults reported by ECU's on the vehicle. Both lists shall allow the operator to review the last 12 events that occurred on the vehicle for maintenance and troubleshooting purposes.
    - Diagnostic screens shall test the instrumentation system to verify it is working correctly.
    - Setup screens shall be used to select either English or metric display. They shall also allow the operator to choose the data that shall be displayed by the configurable on-the-road screens.

The system shall be configured with user defined warning messages such as Low Air Pressure or High Coolant Temperature. When these events occur the warning message shall come up on the screen and can be accompanied by a buzzer. The messages shall be prioritized so the most important messages are always displayed. Whether the message can be dismissed by pressing a button shall be configurable. Messages that have been dismissed but are still active shall be retained in the message screens for review until the ignition is turned off. Listed below are the defined telltales and their indicators.

* "Right and Left Directional" arrows (green in color)
* "Ignition ON" Indicator (amber in color)
* "Hi Beam" indicator (blue in color)
* "Battery ON" indicator (green in color)
* "Parking Brake ON" indicator (red in color)
* "Check Transmission" indicator (amber in color)
* "Cab Not Latched" indicator (red in color)
* "Stop Engine" indicator (red in color)
* "Check Engine" indicator (amber in color)
* "ABS Warning" indicator (red in color)
* "Low Coolant Level" (red in color)
* "Fuel Restriction" indicator (amber in color)
* "Water in Fuel" indicator (amber in color)
* "Fasten Seat Belts" indicator (red in color)
* "Fast Idle" Indicator (amber in color)
* "Do Not Move Truck" indicator (red in color)
* "DPF Regeneration" (amber in color)
* "Exhaust High Temperature" (amber in color)
* "Engine Diagnostic Fault" (amber in color)
* "Retarder On" (green in color)

Listed below are indicators that may be included, depending upon the vehicle configuration:

* "Wait to Start" indicator (amber in color)
* "Exhaust System Fault" (amber in color)
* "Topps System Fault" (amber in color)
* "Lube System Active" (amber in color)
* "Jacks Not Stowed" (red in color)
* "PTO Engaged" (green in color)
* "Inter Axle Lock" (amber in color)
* "Driver Controlled Diff Lock" (green in color)
* "Ok to Pump" (green in color)
* "Auto Traction Control" (amber in color)
* "Retarder Active" (amber in color)
* "Auxiliary Brake Active" (amber in color).
* "ATC Disabled" indicator (red in color)
* "ATC Active" indicator (yellow in color)

Any deviation or exceptions of material, dimensions or performance regardless ofhow minor must be clearly identified as an exception and explained on the exceptions page.

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# COMPASS & TEMPERATURE GAUGE

An Accutech C/T, VFD Compass / Outside Ambient Temperature display shall be provided. The display shall be located on the overhead panel, toward the officer's side. The temperature probe shall be mounted to the underside of the gravel shield, toward the Officers side of the unit.

# CENTER DASH EXTENSION/STORAGE MODULE

The cab instrument panel shall extend between the driver and officer seat positions, protruding from the center dash area over the engine enclosure. The module shall be constructed from the same material as the main dash housing. This module shall provide additional switching and function control capability for the driver and officer.

The module shall be offset to the driver's side to allow map/book storage on the officer side, yet allowing for adequate elbow spacing on both sides of the module. The center console shall also provide two (2) recessed pockets to be used for radio chargers, or storage for miscellaneous items.

# LOWER RIGHT AUXILIARY SWITCH PANEL

The driver’s lower right panel shall be capable of housing five (5) guarded type rocker switches. Examples of the switches that shall be installed in this area are automatic chains, fan clutch over-ride, ATC, inter-axle diff lock, electric fuel pump, all-wheel drive, etc.

# PUMP SHIFT CONTROL

The pump shift control and pump engaged indicator light shall be mounted in the driver's lower left panel.

The pump shift control shall be a Mil Spec toggle switch with mechanical detents mounted in a fully backlit panel that shall have indicators for “Pump Engage” and “Ok to Pump”. The mode of the transfer case shall be controlled by remotely mounted air solenoids which shall be activated and monitored through the chassis control logic of the multiplex system.

# HEATER/DEFROSTER AND AIR CONDITIONING SYSTEM

The cab will be designed with a HVAC system shall be a dual roof mounted SGM air conditioning system capable of cooling a heat soaked cab interior.

The HVAC shall utilize one (1) International Components Engineering #TM-31 HD compressor, mounted as close to level as practicable.  The compressor shall have a serpentine Poly "V" drive belt system installed in accordance with the compressor and belt manufacturer's requirements.

Air conditioning hoses and fittings shall be appropriately sized to the compressor and other specified air conditioning components.  Minimum hose size, shall be #10 hose for discharge and #12 hose for suction.  Steel hose end fittings shall be provided at the compressor.  The air conditioner hose shall be the Aeroquip “Easy Clip” style hoses as recommended by Aeroquip.  The A/C hoses shall utilize FC802 Aeroquip hose with re-usable JIC 37-degree fittings.

One (1) condenser, rated at a minimum of 72,000 BTU cooling and 104,000 BTU heating shall be provided on the cab roof.  Both the front and rear overhead units shall include the heating units. (if applicable, the raised roof shall be equipped with notch to accommodate the condenser unit)

Two (2) evaporators, with a minimum blower output of 720 CFM through the louvers shall be provided.  Both evaporator units shall be mounted on the cab roof, enclosed by aluminum panels painted white.  The evaporator louvers and controls shall penetrate the cab roof into occupant compartments to the least extent practicable.  Fourteen (14) 3" diameter adjustable louvers shall be furnished, four (4) in the front crew area and eight (8) in the rear crew area of the cab.  The A/C drain lines shall be routed to the inside of the cab wheel well area.  Draining condensation into the interior of the cab or onto the occupants, roof or windshield will not be acceptable under any conditions.

The dual evaporator shall be roof mounted to allow service and maintenance without the need to remove interior components or upholstery.

System shall be compatible with R134A refrigerant.

The 12-volt system for the air conditioners shall have first priority to be load managed. The system shall utilize clearly labeled automatic reset-type circuit breakers.

The controls system shall actuate the air-distribution system with air cylinders, which are to be separated from the brake system by an 85-90 psi pressure protection valve.

The air conditioning system shall be configured to only operate when the vehicle's engine is running.

The blowers, in both evaporators, shall be in operation whenever the air conditioning system is activated.

Heater-defroster shall have a three-speed electric fan with a minimum output of 720 CFM through the louvers.  Six (6) 3" diameter adjustable defroster outlets shall be provided for directing warm air to the windshields.  An additional diffuser will be added to each corner of the front overhead, angled to the front door windows to assist with window defrosting. Heater-defroster unit controls shall be illuminated.  Water lines from the engine to heater-defroster shall be 5/8" heater hose with readily accessible flexible connections at each end.  The water lines to the heater shall have brass shut-off valves mounted on the engine to isolate the heater-defroster unit.  The heater hose installation shall not incorporate a copper tube manifold.

The heater/defroster unit shall clear the windshield in half-the-time required by SAE Standards.

A serviceable foam intake filter shall be installed on the rear of the evaporator.

Controls for this HVAC system shall be accessed and controlled through the Class One UltraView screen located either in the cab overhead or on the dash wing panel, both of which shall be easily accessible by the driver.

There shall be no deviation or exceptions of material, dimensions or performance to these requirements.

# ROOF MOUNT CONDENSER

A 12-volt roof top dual condenser shall be strategically positioned on the cab roof so as not to interfere with any emergency lighting systems.  The condenser shall be designed with high performance, long life fan assemblies.  The fan motors are to be equipped with sealed housings and shaft.

The condenser and coil design shall include rifled tubing for maximum efficiency.  Each coil shall be painted black. The condenser unit must include a receiver drier with a high and low-pressure switch.  The wire harness shall include necessary wiring for the clutch circuit as well as a separate power relay circuit.

Mounting design shall enable easy servicing of all components and unit replacement if necessary.

# CLIMATE CONTROL SWITCHES

The multiplex system control screen shall contain all controls for the cab HVAC system. The following controls shall be programmed into the control/display: mode selector switch, front fan speed switch, rear fan speed switch, air conditioning on/off switch, and temperature control dial.

# AUXILIARY HEATERS UNDER REAR FACING OUTER SEAT RISERS

Two (2) SMG H1352 9,850 BTU/H auxiliary heaters shall be provided, located one (1) under each rear facing outboard seat riser. Heater controls for each shall be provided.

A mechanical shut off valve shall be installed on each heater to manually shut down the coolant flow.

There shall be no deviation or exceptions of material, dimensions or performance to these requirements.

# CAB DEFOGGER FANS

Two (2), eight (8) inch diameter, two-speed, defogger fans shall be provided in addition to the standard windshield defroster.

# CAB TILT ASSEMBLY

A hydraulic cab lift system shall be provided, consisting of an electric-powered hydraulic pump, fluid reservoir, dual lift cylinders, remote cab lift controls and all necessary hoses and valves.

The cab tilt mechanism shall be custom designed for ease of maintenance and consist of two (2) hydraulic cylinders. Hydraulic lines shall be rated at 20,000 PSI burst pressure. The hydraulic cylinders shall be equipped with a velocity fuse that protects the cab from accidentally descending when the cab is in the tilt position.

Hydraulic cylinders shall be detachable to allow removal of the engine for major service. A remote cable operated mechanical cylinder stay bar and release shall be provided to insure a positive lock in the tilted position.

The two (2) rear outboard cab latches shall be of the hydraulic pressure release, automatic re-latching type, and provide an automatic positive lock when the cab is lowered. The latch shall not disengage or experience any damage when subjected to a pull apart tensile load of 6,000 lbs. The hydraulic pressure required to unlock the latch shall not exceed 550 PSI. The latch shall withstand 5,000 PSI without leaks or damage and withstand 1,000 continuous cycles of operation under a load of 1,000 lbs. at liftoff. The tilt pump shall be electric over hydraulic type, with a pressure rating of not less than 4,000 PSI. Additionally, the cab tilt device shall be both electrically and hydraulically interlocked to prevent inadvertent activation of the cab tilt system.

* A "CAB NOT LATCHED"indicator shall be provided in the cab dash-warning cluster.
  + - A dual switch control system shall be provided for the cab tilt, located on the passenger side of the vehicle or on the optional tether control. System shall consist of a three (3) position toggle switch along with a rubber covered push button switch.

The cab tilt control shall be equipped with an interlock that shall disable the cab tilt system in the event the parking brake is not applied.

There shall be no deviation or exceptions of material, dimensions or performance to these requirements.

# CHASSIS FRAME ASSEMBLY

The chassis frame shall be fabricated in its entirety at the manufacturer's facility. This will prevent any split responsibility in warranty or service.

The frame shall consist of two (2) channels fastened together by cross members. All structural fasteners used in the frame shall be Grade 8 hardware. Hardened steel washers shall be used under all bolt heads and nuts to avoid stress concentrations. Top flange shall be free of bolt heads. All spring hangers shall be machined steel castings. Frame assemblies that are welded or assembled with “Huck” type fasteners are not acceptable.”

Each main frame rail shall be 10-1/4" x 4" x 3/8", fabricated from Domex™ 110,000 PSI minimum yield steel, with a minimum section modulus of 18.396 cu in and a resisting bending moment (RBM) of 2,023,560-inch pounds. The frame rails shall be drilled “together” (back to back) on a frame drilling machine with an internally cooled drill bit in order to minimize the deviation in hole diameter or location. Frames are built for the specific apparatus under construction so that no unnecessary holes or modifications are made to the frame assembly.

A full length inner frame liner 9.44" X 3.63" X 3/8" shall be installed. Total section modulus of each rail, with liner, shall be 33.56 cu in and the total resisting bending moment (RBM) shall be a minimum of 3,691,050 in-lbs., per rail.

The chassis frame assembly, consisting of frame rails, cross members, axles and steering gear(s), shall be finish painted before installation of any electrical wiring, fuel system components, or air system components. All components or brackets fastened to the frame rails shall be cleaned, primed and painted prior to being attached to the frame rails.

There shall be no deviation or exceptions of material, dimensions or performance to these requirements.

# \*\*\* FRONT BUMPER, EXTENSION & ACCESSORIES \*\*\*

# PAINTED STEEL FRONT BUMPER

A 12" high, 101" wide, painted steel front bumper shall be provided. The bumper shall be constructed from a minimum of .135-gauge steel, which shall be designed with 45-degree welded corners and a 2" flange on the top and bottom. The ends of the bumper shall be supported by horizontal channels, which shall extend from the frame rails to the sides of the bumper. The color of the bumper shall match the cab and body base color.

# BUMPER EXTENSION

The bumper shall be extended 20" with a polished aluminum tread plate gravel shield enclosing the top and ends.

# STORAGE WELL - CENTER

One (1) storage well-constructed of 1/8" aluminum shall be installed in the gravel shield. This storage well shall be center mounted between the chassis frame rails. The bottom of the storage well shall have a minimum of four (4) drain holes.

One (1) hinged, latched, aluminum tread plate cover shall be installed on the storage well located in the center of the bumper extension.

# CENTER WELL - GENERAL STORAGE

The center storage well shall be utilized for general storage of tools or equipment, the well shall be a large as space allows.

# FRONT TOW HOOKS

Two (2) front painted tow hooks shall be fastened directly to the frame, below the front bumper. The tow hooks shall be fastened with grade 8 bolts and nuts.

# LICENSE PLATE BRACKET

A chrome plated license plate bracket shall be provided on the front bumper of the apparatus.

# FRONT AXLE

Front axle shall be a Meritor MFS-20-133 A-N, reversed Elliott "I" beam type and include low friction "Easy Steer" bushing technology for maximum steering ease and longer life.

The front axle shall be rated at 20,000 lbs.

# FRONT DISC BRAKES

Meritor EX-225 H, 17”-disc brakes shall be provided for the front axle. The front brakes shall be full air actuated with automatic slack adjustment.

# PARABOLIC FRONT SUSPENSION

Front suspension shall be parabolic type front leaf springs.  The spring shall be permanently pinned at the front and have a shackle double pinned mounting at the rear.

The front leaf spring shall have a minimum of 3 leaves, a minimum length of 54", and a minimum width of 4".  The capacity at ground shall be 20,000 lbs.  All springs shall be of center bolt design. All spring pin joints shall be maintenance free, rubber bushed for vibration reduction and positively restrained from rotating in brackets and shackles.

# FRONT SHOCK ABSORBERS

The front suspension system shall be equipped with Monroe, model "Magnum - 70", double acting hydraulic shock absorbers. Shock absorbers to have a minimum bore of 1.38" and an outside diameter of approximately 3-1/4".

# REAR AXLE

Rear axle shall be a single, Meritor RS-24-160 with a capacity of 24,000 lbs. (Minimum). Axle shall be a single reduction type and have a gear ratio as required. Oil seals shall be provided as standard equipment.

# REAR BRAKES

Meritor EX-225 H, 17”-disc brakes shall be provided for the rear axle. The rear brakes will be full air actuated with automatic slack adjustment.

# REAR AXLE TOP SPEED

The rear axle/s shall be geared for a vehicle top speed in accordance with NFPA sections 4.15.2 and 4.15.3.

Units with GVWR over 26,000 pounds shall be limited to 68 mph. If the combined tank capacity is over 1250 gallons of foam and water or the GVWR is over 50,000 pounds, the vehicle top speed shall be limited to 60 mph or the fire service rating of the tires, whichever is lower.

# TIRE CHAINS

The vehicles rear drive axle shall be equipped with an On-Spot 18 strand tire chain system. The system shall utilize the existing vehicle air compressor system. A switch shall be provided in the driver’s console area to control the activation of the chains. The switch shall have a safety feature, which does not allow for inadvertent activation.

# REAR SUSPENSION

The rear suspension shall be leaf type, variable rate with a 24,000-lb. rating. The main spring assembly shall consist of 14 leaves with the main spring measuring 60.5" L x 3" W.

There shall be a rubber block helper mounted above the leaf springs, rated at 4,500 lbs. Two (2) fully wrapped leaves shall transmit driving and braking torque. Rating shall be designed to match or exceed the rear axle weight rating.

# \*\*\*\*\* AIR & BRAKE SYSTEM \*\*\*\*\*

# BRAKE SYSTEM

A dual circuit, air operated braking system, meeting the design and performance requirements of FMVSS -121 and the operating test requirements of NFPA 1901 current edition shall be installed. It shall be direct air type with dual air treadle in the cab. The system shall be powered by an engine mounted, gear driven air compressor protected by a heated air dryer.

The air system shall be plumbed with reinforced, air brake tubing/hose in conformance to SAE J 844-94, Type B and U.S.D.O.T. standards. The compressor discharge shall be plumbed with stainless steel braided hose lines with a Teflon lining. Eaton Synflex Eclipse Air Brake tubing shall be run along the inside frame rails and connected with push to connect type fittings that meet or exceed all industry standards. All Synflex shall be secured with non-conductive, corrosion resistant strapping mounted with standoff fasteners.

Cord reinforced rubber hose lines with brass fittings shall be installed from the frame rails to axle mounted air connections.

The air system shall provide a rapid air build-up feature and low-pressure protection valve with light and buzzer, designed to meet the requirements of NFPA 1901, current edition.

# ABS SYSTEM

An Anti-Skid Braking System (ABS) shall be provided to improve braking control and reduce stopping distance. This braking system shall be fitted to all of the axles. All electrical connections shall be environmentally sealed, water, weatherproof, and vibration resistant.

The system shall constantly monitor wheel behavior during braking. Sensors on each wheel shall transmit wheel speed data to an electronic processor which shall sense approaching wheel lock causing instant brake pressure modulation up to 5 times per second in order to prevent wheel lockup. Each wheel shall be individually controlled.

To improve service trouble shooting, provisions in the system for an optional diagnostic tester shall be provided. The system shall test itself each time the vehicle is started. A dash-mounted light shall go out once the vehicle has attained 4 mph after successful ABS start-up. To improve field performance; the system shall be equipped with a dual circuit design. The system circuits shall be configured in a diagonal pattern. Should a malfunction occur, the defective circuit shall revert to normal braking action. A warning light shall signal malfunction to the operator. The system shall consist of a wheel mounted toothed ring, sensor, sensor clip, electronic control unit and solenoid control valve.

The sensor clip shall hold the sensor in close proximity to the toothed ring. An inductive sensor consisting of a permanent magnet with a round pole pin and coil shall produce an alternating current with a frequency proportional to wheel speed. The unit shall be sealed, corrosion resistant and protected from electromagnetic interference. The electronic control unit shall monitor the speed of each wheel. A deviation shall be corrected by cyclical brake application and release. If a malfunction occurs, the defective circuit shall signal the operator and the malfunctioning portion of the system shall shut down. The system shall be installed in a diagonal pattern for side-to-side control. The system shall insure that each wheel is braking to optimum efficiency up to 5 times a second.

The system shall also control application of the auxiliary engine exhaust or drive line brakes to prevent wheel lock.

This system shall have a three (3) year or 300,000-mile parts and labor warranty as provided by Meritor Wabco Vehicle Control Systems.

# AUTOMATIC TRACTION CONTROL (ATC)

To further improve vehicle drive characteristics, the unit shall be fitted with automatic traction control (ATC). This system shall control drive wheel slip during acceleration from a resting point. An extra solenoid valve shall be added to the ABS system. The system shall control the engine and brakes to ensure efficient acceleration. The system shall be equipped with a dash-mounted light that shall come on when ATC is controlling drive wheel slip. The system shall also include an "off road traction" dash mounted switch that will allow the operator to momentarily allow for more wheel slip when the unit is in deep mud or snow.

This system shall have a three (3) year or 300,000-mile parts and labor warranty as provided by Meritor Wabco Vehicle Control Systems.

# ELECTRONIC STABILITY CONTROL (ESC)

An Electronic Stability Control (4 or 6 Channel) shall be provided as part of the Standard ABS system. The Electronic Stability Control system is capable of recognizing and assisting in both rollover and vehicle-under and over-steer situations through advanced monitoring of vehicle parameters and automatic and selective application of the chassis brakes. The Electronic Stability system uses lateral and yaw accelerometers, wheel speed sensors, ABS pressure modulator valves and an ECU to control the four corners of a vehicle.

The controller monitors the vehicle response to turning and braking and adjusts or modulates the brake pressure at the wheel end to slow the vehicle in roll control, stabilize the vehicle when under or over steering, and modulate brake pressure when excessive wheel slip, or wheel lockup is detected. By these actions, the ESC system helps to maintain the vehicle’s lateral and roll stability at all times, and improves braking and steer ability during heavy brake applications and during braking on slippery surfaces.

# BRAKE AIR RESERVOIRS

There shall be a minimum of three (3) air reservoirs installed in conformance with best automotive practices. Reservoir capacity total shall be a minimum of 4693 cubic inches.

The air reservoirs shall be color coded to match the air lines for easy identification, ease of maintenance and troubleshooting. The reservoirs shall be painted the following colors:

* + - Wet Tank Black
    - Primary Tank Green
    - Secondary Tank Blue

For ease of daily maintenance, each air system reservoir shall be equipped with a brass 1/4 turn drain valve.

**For ease of maintenance and repair there shall be no exception to the color coding of the air tanks.**

# AIR DRYER SYSTEM

A Meritor/Wabco System Saver 1200 heated air dryer shall be furnished. An automatic moisture ejector on the primary shall also be furnished.

# AIR LINES

The entire chassis air system shall be plumbed utilizing reinforced, Synflex air lines, which shall be equipped with quick release type fittings. All of the airlines shall be color coded to correspond with an air system schematic and shall be adequately protected from heat and chafing.

**For ease of maintenance and repair there shall be no exception to the color coding of the air tanks.**

# AIR COMPRESSOR

Air compressor shall be a Wabco brand, minimum of 18.7 cubic feet per minute capacity. Air brake system shall be the quick build up type. The air compressor discharge line shall be stainless steel braid reinforced Teflon hose.

A pressure protection valve shall be installed to prevent the use of air horns or other air operated devices should the air system pressure drop below 80 psi (552 kPa).

The chassis air system shall meet NFPA 1901, latest edition for rapid air pressure build-up within sixty (60) seconds from a completely discharged air system. This system shall provide sufficient air pressure so that the apparatus has no brake drag and is able to stop under the intended operating conditions following the sixty (60) seconds build-up time.

# BRAKE TREADLE VALVE

A Bendix dual brake treadle valve shall be mounted on the floor in front of the driver. The brake control shall be positioned to provide unobstructed access and comfort for the driver.

# PARKING BRAKE

Parking brake shall be of the spring-actuated type, mounted on the rear axle brake chambers. The parking brake control shall be mounted on the cab center instrument panel, offset toward the driver. A red indicator light shall be provided in the driver dash panel that shall illuminate when the parking brake is applied.

# AUXILIARY AIR INLET/AUTO EJECT

A Kussmaul Auto Air Eject #091-28 inlet shall be provided on the driver side of the cab. The Air Eject shall be mounted using a Kussmaul Weatherproof Adapter Kit #091-28AK.

The Kussmaul air-eject connection shall be equipped with a Red weatherproof cover.

The air eject shall be located on the bumper extension gravel shield, on the driver's side in a pre-determined location by The Bidder.

# FRONT WHEELS & TIRES

The front wheels shall be 22.5" x 12.25" ten stud, hub piloted polished aluminum disc type.

The front wheels shall be provided with bright nut covers and hub caps.

The front tires shall be Michelin 425/65R22.5 "20 Ply" tubeless radial XZY3 wide base mixed tread. The tires shall be fire service rated up to 24,396 lbs. and shall have a top speed of 65 mph when inflated to 120 psi.

Fire Service Rating means operations not to exceed one hour loaded travel at maximum speed, with at least a one hour cool down prior to another loaded run.

Industry load and inflation standards are in a constant state of change. Printed material may not reflect the latest load and inflation standards.

# REAR WHEELS & TIRES

The single rear axle wheels shall be 22.5" x 8.25" ten stud, hub piloted disc type. The inner wheels shall be painted steel, the outer wheels shall be polished aluminum.

The single rear axle aluminum disc wheels shall be provided with bright nut covers and hub caps.

The rear tires shall be Michelin 12R22.5 "16 Ply" tubeless radial XDN2 traction tread. The tires shall be fire service rated up to 29,020 lbs. and shall have a top speed of 75 mph when inflated to 120 psi.

Fire Service Rating means operations not to exceed one hour loaded travel at maximum speed, with at least a one hour cool down prior to another loaded run.

Industry load and inflation standards are in a constant state of change. Printed material may not reflect the latest load and inflation standards.

# TIRE PRESSURE MONITORING DEVICES

Each tire shall be equipped with an LED tire alert pressure management system (Vecsafe equal) that shall monitor tire pressure. A chrome plated brass sensor shall be provided on the valve stem of each tire.

The sensor shall calibrate to the tire pressure when installed on the valve stem for pressures between 10 and 200 psi. The sensor shall activate an integral battery-operated LED when the pressure of that tire drops 8 psi.

# \*\*\*\*\* ENGINE, TRANSMISSION & ACCESSORIES \*\*\*\*\*

# ENGINE

Engine shall be a Cummins, Model L9 450, diesel, turbo-charged, electronically controlled, per the following specifications.

* + - Max. Horsepower 450 HP @ 2100 RPM
    - Governed Speed 2200 RPM
    - Peak Torque 1250 lb. ft. @ 1400 RPM
    - Cylinders Six (6)
    - Operating Cycles Four (4)
    - Bore & Stroke 4.49 x 5.69 in.
    - Displacement 543 cu. in.
    - Compression Ratio 16.6:1
    - Governor Type Limiting Speed
    - Drive line Size 1710

Engine oil filters shall be engine manufacturers branded or approved equal. Engine oil filters shall be accessible for ease of service and replacement.

A fuel/water separator shall be provided.

# ENGINE CHASSIS CERTIFICATION

The engine shall be installed in accordance with engine manufacturer's instructions. The Bidder shall be able to furnish proof of engine installation approval by the engine manufacturer.

# COOLING/RADIATOR

**Radiator shall be brass with bolted steel top and bottom tanks. No exceptions**

Radiator and charge air cooler shall be aluminum with welded aluminum top and bottom tanks.  The cooling system shall be designed for a maximum of fifteen (15) PSI operation.

There shall be a sight glass on the surge tank to check the coolant level without removing the radiator cap.  The core construction shall be aluminum bar/plate. Fin density should be a maximum of ten (10) fins per inch.

Extended life engine coolant shall provide anti-freeze protection to -30° F. The mixture shall be per the engine manufacture's specifications.

Core area shall be a minimum of 1525 square inches (48.5" H x 31.5"W)

The engine cooling system shall have an inline coolant filter that shall have a shut off valve for ease of maintenance.

The engine cooling system shall be certified by the engine manufacturer to meet cooling index requirements for a minimum ambient temperature or 110-degrees Fahrenheit.

Any deviation or exceptions of material, dimensions or performance must be clearly identified as an exception and explained on the exceptions page.

# TRANSMISSION COOLER

A shell and tube transmission oil cooler shall be provided using engine coolant to control the transmission oil temperature.  The cooler shall have an aluminum shell and copper tubes.  The cooler shall be assembled using pressed in rubber tube sheets to mechanically create a reliable seal between the coolant and the oil.  No brazed, soldered, or welded connections shall be used to separate the coolant from the oil.

# RADIATOR CROSSMEMBER

The radiator installation shall include a radiator crossmember for additional strength and durability. This crossmember shall be designed so the angle of approach is not affected.

# CHARGE AIR COOLER

The charge air cooler shall be constructed of aluminum with cast aluminum side tanks. The cooler shall have a frontal core size of 957 square inches, seven (7) fins per inch, and forty-eight (48) core tubes.

The charge air cooler shall be mounted directly ahead of the radiator and to the radiator headers. Rubber isolators shall be used at the mounting points to reduce transmission of vibrations.

Where applicable, the charge air cooler pipes shall be constructed of appropriately sized aluminized steel tubing with 0.06” wall thickness and formed hose barbs. The connections between these pipes, the engine and charged air cooler, shall be made using high temperature silicone hoses rated for use in temperature up to 500°F, and heavy duty constant tension T-Bolt spring hose clamps. These connections shall adequately allow for movement of the engine relative to the charged air cooler.

Any deviation or exceptions of material, dimensions or performance must be clearly identified as an exception and explained on the exceptions page.

# COOLING SYSTEM FAN

The engine cooling system shall incorporate a heavy-duty fan, installed on the engine and include a shroud.

The fan shall be equipped with an air operated clutch fan, which shall activate at a pre-determined temperature range.

Recirculation shields shall be installed to ensure that air which has passed through the radiator is not drawn through it again.

# COOLANT HOSE AND PIPING

All coolant piping shall be constructed of appropriately sized powder coated steel tubing with 0.06” wall thickness and formed hose barbs. All connections between coolant pipes and chassis components shall be made using appropriately sized silicone hoses or elbows, rated for use in temperatures ranging from -60°F to +350°F, and appropriately sized constant torque hose clamps. These connections shall be minimal in number to reduce the number potential leak points, and shall adequately allow for movement of the engine relative to chassis mounted components. All integral hoses supplied with the engine shall be as supplied by the engine manufacturer.

# HEATER HOSES

Premium Goodyear Hi-Miler® blue heater hoses shall be furnished for the heater system. The Hi-Miler® hose shall have a core of black Versigard (EPDM) with spiral Flextan reinforcement and blue Versigard coating. All heater hoses shall be equipped with constant torque type hose clamps. All integral hoses supplied with the engine shall be as supplied by the engine manufacturer.

**Any deviation or exceptions of material, dimensions or performance must be clearly identified as an exception and explained on the exceptions page.**

# ENGINE BRAKE

An engine compression brake shall be furnished for increased braking capabilities. Controls shall be as provided by the engine manufacturer and shall be activated by releasing the throttle pedal to the idle position.

The engine compression brake shall have dash mounted control switches to turn the brake on or off as well as to control the operational level of the brake.

The engine brake shall be wired in such a manner so as to illuminate the chassis brake lights when the engine brake is engaged and operating.

The engine brake shall be interlocked with the PTO operation and shall automatically disengage any time the apparatus is operating with the PTO active.

**Any deviation or exceptions of material, dimensions or performance must be clearly identified as an exception and explained on the exceptions page.**

# ENGINE FAST IDLE

A fast idle for the electronic controlled engine shall be provided. The fast idle shall be controlled by an ON/OFF switch on the dash.

An electronic interlock system shall prevent the fast idle from operating unless the transmission is in "Neutral" and the parking brake is fully engaged. If the fast-idle control is used in conjunction with a specified engine/transmission driven component or accessory, the fast-idle control shall be properly interlocked with the engagement of the specified component or accessory.

# AIR CLEANER

An engine air cleaner shall be provided. The air cleaner shall include a dry type element and shall be installed in accordance with the engine manufacturer's recommendations. The air cleaner shall be located to the rear of the engine, with streamline air pipes and hump hose connections from the inlet to the air cleaner and from the air cleaner to the turbo.

The air cleaner shall be easily accessible when the cab is tilted. The air cleaner shall be plumbed to the air intake system that shall include a self-sealing connection between the cab and air cleaner assembly to allow the cab to be tilted.

To draw fresh clean air, the intake for the air cleaner shall be on the side of the cab on the driver's side. The inlet shall be a minimum of 41" above the ground to allow the vehicle to navigate through water without any part of the air intake system being below the frame rail, preventing any type of water intake.

# SPARK ARRESTOR

A spark arrestor shall be installed in the chassis air intake system. This arrestor shall be mounted behind the intake grille to filter out airborne embers. The spark arrestor housing must be easily accessible when the cab is tilted.

# ACCELERATOR CONTROL

A floor mount accelerator pedal shall be installed on the floor in front of the driver. The pedal shall be positioned for comfort with ample space for fire boots and adequate clearance from the brake pedal control.

# REMOTE THROTTLE CONTROL 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 to required throttle control harnesses.  The harness shall contain necessary connectors for a 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.

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.

# TRANSMISSION

An Allison World Transmission, Model 3000 EVS electronically controlled, automatic transmission shall be provided. Transmission specifications shall be as follows:

* + - Max. Gross Input Power 450 HP
    - Max. Gross Input Torque 1250 lb. ft.
    - Input Speed (Range) 2000- 2800 RPM
    - Direct Gear (Pumping) 4th (Lock-up)

Transmission installation shall be in accordance with the transmission manufacturer's specification. The transmission shall be readily and easily removable for repairs or replacement.

One (1) PTO opening shall be provided on both the left and right side of the converter housing (positions four (4) o'clock and eight (8) o'clock).

The transmission shall be calibrated for five (5) forward gears and one (1) reverse gear. Each gear shall have the following ratios:

* + - First 3.49:1
    - Second 1.86:1
    - Third 1.41:1
    - Fourth 1.00:1
    - Fifth 0.75:1
    - Reverse -5.03:1

# TRANSMISSION SHIFT SELECTOR

An illuminated, touch-pad type shift control shall be mounted in the cab, convenient to the driver. Shift control shall be approved by the transmission manufacturer.

# TRANSMISSION OIL LEVEL SENSOR

The transmission shall be equipped with the oil level sensor (OLS); this sensor shall allow the operator to obtain an indication of the fluid level from the shift selector. The sensor display shall provide the following checks, correct fluid level, low fluid level and high fluid level.

# PARK TO NEUTRAL

The transmission, upon application of the parking brake, shall automatically shift into neutral.

# PRESELECT PROGRAMMING

The transmission shall have Allison Pre-select enabled to automatically downshift when the secondary engine brake is active.

The transmission shall be programmed at the factory to automatically downshift to 4th gear.

This feature shall be enabled/disabled with the main on/off switch for the engine brake.

# SYNTHETIC TRANSMISSION FLUID

TES 295 transmission fluid shall be utilized to fill the 3000 EVS transmission.

# DRIVE LINES

Drive lines shall be Dana (Spicer) 1710 heavy duty series or equal, with "glide coat" splines on all slip shafts. The manufacturer shall utilize an electronic type balancing machine to statically and dynamically balance all drive shafts. The manufacturer shall provide proof of compliance with all drive shaft manufacturer's standards and specifications.

Where applicable, the universal joints shall be the half loop style joints.

# DIESEL EXHAUST FLUID TANK

A five (5) gallon diesel exhaust fluid (DEF) tank shall be provided and installed. The tank shall be mounted in the area of the battery box and shall be accessible through a door in the crew area step well.

The tank shall include an internal heater that will be fed by engine coolant directly from the engine block to ensure it is always kept at the proper temperature per EPA requirements. The tank shall include a temperature sensor to control the flow of the engine coolant from the heater valve to the DEF tank.

A DEF fluid level senor shall be provided with the DEF tank and connected to the level gauge on the dashboard.

# EXHAUST SYSTEM

The exhaust system shall be installed in accordance with the engine manufacturer's requirements and meet all Environmental Protection Agency and State noise level requirements. Exhaust system components shall be securely mounted and easily removable.

The diesel particulate filter/muffler shall be fabricated from stainless steel and of a size compatible with the engine exhaust discharge.

Exhaust tubing shall be a minimum of 16-gauge stainless steel from the turbocharger on the engine to the inlet of the diesel particulate filter. Any flexible exhaust tubing shall be HDT stainless steel type. To minimize heat build-up, exhaust tubing within the engine compartment shall be wrapped with an insulating material. Exhaust shall be wrapped from the turbocharger to the entrance of the muffler. Material shall be held in place with worm gear type clamps.

An exhaust diffuser shall be provided to reduce the temperature of the exhaust as it exits the tailpipe.

Separate "regeneration" enable and prohibit switches shall be provided under the dash board on the driver's side. Each switch shall be provided with a spring loaded protective cover and shall be clearly marked as to function.

# SELECTIVE CATALYTIC REDUCTION (SCR)

The vehicle shall be equipped with SCR technology that uses a urea based diesel exhaust fluid (DEF) and a catalytic converter to significantly reduce oxides of nitrogen (NOx) emissions.

The SCR system shall reduce levels of NOx (oxides of nitrogen emitted from engines) by injecting small quantities of diesel exhaust fluid (DEF) into the exhaust upstream of a catalyst, where it vaporizes and decomposes to form ammonia and carbon dioxide.

The ammonia (NH3), in conjunction to the SCR catalyst, converts the NOx to harmless nitrogen (N2) and water (H2O).

The exhaust tailpipe extending from the SCR catalyst to the side of the vehicle shall be constructed from 16-gauge aluminized steel tubing. The exhaust discharge shall be on the officer side of the apparatus forward of the rear axle.

# \*\*\*\* FUEL SYSTEM \*\*\*\*

# FUEL TANK

Fuel tank shall be a minimum of fifty (50) gallon capacity. It shall have a minimum fuel filler neck of 2" ID and 1/4 turn fill cap. A 1/2" minimum diameter drain plug shall be provided. The tank shall be fabricated from hot rolled, pickled and oiled steel. Provisions for an additional feed line and fuel level float shall be provided for future use.

The fuel tank shall be installed behind the rear wheels between the frame rails.

The fuel tank shall meet all FHWA 393.67 requirements including a fill capacity of 95% of tank volume.

The fuel tank shall be able to withstand a longitudinal acceleration of -23.0g at 0.166 seconds in accordance to SAE J211 standards using a channel frequency class 600 filter. Testing shall be performed at and verified by a third-party testing and evaluation center.

# FUEL TANK STRAPS

The straps supporting the diesel fuel tank shall be made of Type 304L stainless steel with grade 8, zinc coated steel hardware.

The fuel tank mounting straps shall utilize dense rubber between the straps and the fuel tank to prevent chaffing.

Fuel lines shall be an Aeroquip FC332 AQP Series fiber reinforced hose.  The lines shall be sized to meet engine manufacture's requirements, and shall be carefully routed and secured along the inside of the frame rails.

There shall be no exception to this requirement

# FUEL FILTER/WATER SEPARATOR

A fuel filter/water separator shall be provided in the fuel system. A "water in fuel" indicator shall be provided on the dash.

# SECONDARY ELECTRIC FUEL PUMP

In addition to the primary fuel pump, a secondary electric fuel pump for re-priming shall be furnished in the main fuel line. A labeled control switch shall be provided on the main dash panel.

# FUEL POCKET

A fuel fill shall be provided in the left side rear wheel well area. A Cast Products heavy duty cast aluminum spring loaded hinged fill door shall be provided.

A label indicating "Ultra Low Sulfur Diesel Fuel Only" shall be provided adjacent to the fuel fill.

# DUAL POWER STEERING

A dual power steering system shall be provided utilizing a Sheppard model #M110 main steering gear on the driver side of the chassis and a Sheppard model #M90 steering gear on the officer side of the chassis.

The power steering gear on the officer side of the chassis shall increase performance in turning the officer side wheel assembly, reducing loads and forces on the main gear and components.

The steering system shall be designed to maximize the turning capabilities of the front axle no matter the rating and tire size. The use of a power assist cylinder on the officer side of the chassis is NOT ACCEPTABLE on front axles of this capacity.

The system shall be designed utilizing an engine driven hydraulic pump, with a maximum operating pressure of 2000 PSI. Steering design shall permit a maximum of 5.6 turns from stop to stop. Steering system components shall be mounted in accordance with the steering gear manufacturer's instructions.

**For maintenance and longevity there shall be no exceptions to this requirement.**

# STEERING COLUMN

The steering column shall be a “Douglas Autotech” tilt and telescope column. A lever mounted on the side of the column shall control the tilt and telescope features.

The steering shaft from the column to the miter box shall have a rubber boot to cover the shaft slip and a second rubber boot to seal the passage hole in the floor.

There shall be a self-canceling lever that shall control the following functions:

* + - Left and right turn signals
    - High beam activation
    - Two speed with intermittent windshield wiper control
    - Windshield washer control

# STEERING WHEEL

The steering wheel shall be a two (2) spoke, vinyl padded, minimum 18" diameter, with a center hub mounted horn button.

# ROAD SAFETY KIT

A road safety kit shall be furnished with the following equipment:

* + - 2 1/2 lb. B-C fire extinguisher
    - Triangle safety reflectors.

# \*\*\*\*\* CHASSIS/BODY ELECTRICAL & ACCESSORIES \*\*\*\*\*

# CHASSIS ELECTRICAL SYSTEM

All electrical wiring in the chassis shall be GXL cross link insulated type. Wiring is to be color coded and include function codes every three (3) inches on both sides. Wiring harnesses shall be routed in protective, heat resistant loom, securely and neatly installed. Two (2) power distribution centers shall be provided in central locations for greater accessibility. The power distribution centers shall contain thermal automatic reset breakers, power control relays, flashers, diode modules, daytime driving light module, and engine and transmission data links. All breakers and relays shall have a capacity substantially greater than the expected load on the related circuit, thus ensuring long component life.

Power distribution centers shall be composed of a system of interlocking plastic modules for ease in custom construction.

The power distribution centers are function oriented. The first is to control major truck function. The second shall control center to overhead switching and interior operations. Each module is single function coded and labeled to aid in troubleshooting. The centers will also have accessory breakers and relays for future installations. All harnesses and power distribution centers shall be electrically tested prior to installation to ensure the highest system reliability.

All external harness interfaces shall be of a triple seal type connection to ensure a proper connection. The cab/chassis and the chassis/body connection points shall be mounted in accessible locations. Complete chassis wiring schematics shall be supplied with the apparatus.

**For maintenance and longevity there shall be no exceptions to this requirement**

# WIRING HARNESS DESCRIPTION

The wiring harness contained on the chassis shall be designed to utilize wires of stranded copper or copper alloy of a gauge rated to carry 125% of maximum current for which the circuit is protected without exceeding 10% voltage drop across the circuit. Wiring shall be uniquely identified by color code or circuit function code, labeled at a minimum of every three (3) inches. The identification of the wiring shall be referenced on a wiring diagram. All wires conform to SAEJ1127 (Battery Cable), SAEJ1128 (Low Tension Primary Cable), SAEJ1560 (Low Tension Thin Wall Primary Cable).

The covering of harnesses shall be moisture resistant loom with a minimum rating of 289° Fahrenheit and a flammability rating of VW-1 as defined in UL62. The covering of jacketed cable shall have a minimum rating of 289° Fahrenheit.

All circuits shall conform to SAEJ1292. All circuits must be provided with low voltage over current protective devices.

All exposed electrical connections will be coated with “Z-Guard” to prevent corrosion.

**For maintenance and longevity there shall be no exceptions to this requirement**

# DIRECT GROUNDING STRAPS

Direct grounding straps shall be mounted to the following areas; frame to cab, frame to body and frame to pump enclosure.

All exposed electrical connections shall be coated with "Z-Guard 8000" to prevent corrosion.

# 12 VOLT ELECTRICAL SYSTEM TESTING

The apparatus low voltage electrical system shall be tested and certified by the manufacturer. The certification shall be provided with the apparatus. All tests shall be performed with air temperature between 0°F and 100°F.

The following three (3) tests shall be performed in order. Before each test, the batteries shall be fully charged.

# TEST #1-RESERVE CAPACITY TEST

The engine shall be started and kept running until the engine and engine compartment temperatures are stabilized at normal operating temperatures and the battery system is fully charged. The engine shall be shut off and the minimum continuous electrical load shall be activated for 10 minutes. All electrical loads shall be turned off prior to attempting to restart the engine. The battery system shall then be capable of restarting the engine. Failure to restart the engine shall be considered a test failure.

# TEST #2-ALTERNATOR PERFORMANCE TEST AT IDLE

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

# TEST #3-ALTERNATOR PERFORMANCE TEST AT FULL LOAD

The total continuous electrical load shall be activated with the engine running up to the engine manufacturers governed speed. The test duration shall be a minimum of 2 hours. Activation of the load management system shall be permitted during this test. However, an alarm sounded due to excessive battery discharge, as detected by the system, or a system voltage of less than 11.7 volts DC for a 12-volt system, for more than 120 seconds, shall be considered a test failure.

# LOW VOLTAGE ALARM TEST

Following completion of the preceding tests, the engine shall be shut off. The total continuous electrical load shall be activated and shall continue to be applied until the excessive battery discharge alarm is activated.

The battery voltage shall be measured at the battery terminals. With the load still applied, a reading of less than 11.7 volts shall be considered a test failure. The battery system shall then be able to restart the engine.

At time of delivery, documentation shall be provided with the following information:

* + - Documentation of the electrical system performance test
    - A written load analysis of the following;
    - Nameplate rating of the alternator
    - Alternator rating at idle while meeting the minimum continuous electrical load
    - Each component load comprising the minimum continuous electrical load.
    - Additional loads that, when added to the minimum continuous load, determine the total connected load.
    - Each individual intermittent load.

# ELECTRICAL MANAGEMENT SYSTEM

A Class 1 ES-Key Electrical Management System shall be utilized on the chassis for all functions applicable. The system shall consist of the following components:

A Modem with a RS232 computer interface and standard telephone jack used to not only program the multiplex system but also serve as a factory direct gateway into the vehicle from any Class 1 multiplex authorized service facility.

A Universal System Manager (USM), which acts as the main controlling component of the multiplexing system shall be provided and factory programmed to DOT, NFPA, SAE, the manufacturer and East Valley Fire Department specifications. The programming shall be done by the manufacturer's engineering department. The ES-Key system installation shall comply with SAE J 551 requirements regarding Electromagnetic and Radio Frequency interference (EMI, RFI), as well as utilize components and wiring practices that insure the system is protected against corrosion, excessive temperatures, water, excessive physical, and vibration damage by any equipment installed on the vehicle at the time of delivery.

A series of Multiplexing Input/Output Modules shall be installed. The Input/Output modules shall permit the multiplexing system to reduce the amount of wiring and components used as compared to non-multiplexed apparatus. These modules shall vary in I/O configuration, be waterproof allowing installation outside of enclosed areas and shall possess individual output internal circuit protection. The modules shall also have three status indicators visible from a service persons vantage point that shall indicate the status of the module. In the event a load requires more than 7.5 AMPS of operating current, the module shall activate a simple relay circuit integral to any of the 3 dillbox assemblies installed in the cab.

Diagnostic software shall be provided to download data from the on-board ES-KEY system. This software shall have the ability to view system input/output (I/O) information, and include a connection from a computer to the vehicle.

A Class1 UltraView # UV700 7" color transmissive TFT display for monitoring critical apparatus and engine information shall be provided an installed. The displays shall be CAN based utilizing J1939 message protocol. The display shall utilize a bonded LCD display screen for optimal visibility in direct sunlight.

The display shall be fully configurable and when used in conjunction with the Class1 ES-Key system and shall be custom programmed to control multiple apparatus functions and perform onboard apparatus and engine diagnostics.

# CLASS ONE REAR VISION CAMERA

A camera kit {will/shall} be provided and installed at the rear of the apparatus. The video output from the camera {will/shall} be displayed on the UltraView display panel.

# INTERLOCK INTERFACE MODULE

A Vocation Module, which is the interface between the multiplexing system and the pump system shall be provided. This module shall serve as the interface between the operator, engine, transmission and pumping system.

The module shall be installed under the driver's side dash, in a sealed enclosure that shall possess green indicating LEDs that shall indicate to service personnel the interlock state of the apparatus. In the event of a multiplexing error involving pump operation can be activated to ensure reliable pumping operations at ALL times. In addition to controlling pump function, this vocation module shall be able to provide automatic and/or manual activation of engine “Fast Idle”, to maintain adequate alternator output and thus, chassis voltage.

The control screen shall be equipped with a Weldon model 0J50-1505-01 swivel mount that shall allow the screen unit to be turned 180 degrees toward the officer or the driver.

# CHASSIS DIAGNOSTICS SYSTEM

Diagnostic ports shall be accessible while standing on the ground and located inside the driver's side door left of the steering column. The diagnostic panel shall allow diagnostic tools such as computers to connect to various vehicle systems for improved troubleshooting providing a lower cost of ownership. Diagnostic switches shall allow engine and ABS systems to provide blink codes should a problem exist.

The diagnostic system shall include the following:

* A single port to monitor the engine, transmission and ABS system and

diagnostics of the roll sensor (if applicable)

* Engine diagnostic switch (blink codes)
* ABS diagnostic switch (blink codes)
* Allison Transmission Codes (through touch pad shifter)

# VOLTAGE MONITOR SYSTEM

A voltage monitoring system shall be provided to indicate the status of the battery system connected to the vehicle's electrical load. The system shall provide visual and audible warning when the system voltage is below or above optimum levels.

The alarm shall activate if the system falls below 11.8 volts DC for more than two (2) minutes.

# INDICATOR LIGHT AND ALARM PROVE-OUT SYSTEM

A system shall be provided which automatically tests basic indicator lights and alarms located on the cab instrument panel.

# 12 VOLT SEQUENCER

A sequencer shall be provided that automatically activates and deactivates vehicle loads in a preset sequence thereby protecting the alternator from power surges. This sequencer operation shall allow a gradual increase or decrease in alternator output, rather than loading or dumping the entire 12-volt load to prolong the life of the alternator.

Emergency light sequencing shall operate in conjunction with the emergency master light switch. When the emergency master switch is activated, the emergency lights shall be activated one by one at half second intervals. Sequenced emergency light switch indicators shall flash while waiting for activation.

When the emergency master switch is deactivated, the sequencer shall deactivate the warning light loads in the reverse order.

Rear of cab Air-Conditioning and Heat shall be load managed.

# ELECTRICAL HARNESS REQUIREMENT

To ensure dependability, all 12-volt wiring harnesses installed by the manufacturer shall conform to the following specifications:

* SAE J 1128 - Low tension primary cable
  + - SAE J 1292 - Automobile, truck, truck-tractor, trailer and motor coach wiring
    - SAE J 163 - Low tension wiring and cable terminals and splice clips
    - SAE J 2202 - Heavy duty wiring systems for on-highway trucks
    - NFPA 1901 - Standard for automotive fire apparatus
    - FMVSS 302 - Flammability of interior materials for passenger cars, multipurpose passenger vehicles, trucks and buses
    - SAE J 1939 - Serial communications protocol
    - SAE J 2030 - Heavy-duty electrical connector performance standard
    - SAE J 2223 - Connections for on board vehicle electrical wiring harnesses
    - NEC - National Electrical Code
    - SAE J 561 - Electrical terminals - Eyelet and spade type
    - SAE J 928 - Electrical terminals - Pin and receptacle type A.

For increased reliability and harness integrity, harnesses shall be routed throughout the cab and chassis in a manner which allows the harnessing to be laid into its mounting location. Routing of harnessing which requires pulling of wires through tubes is never allowed at the manufacturer.

Wiring shall be run in loom or conduit where exposed, and have grommets or other edge protection where wires pass through metal. Wire colors shall be integral to each wire insulator and run the entire length of each wire. Harnessing containing multiple wires and uses a single wire color for all wires shall not be allowed. Function and number codes shall be continuously imprinted on all wiring harness conductors at 3.00" intervals. All wiring installed between the cab and into doors shall be protected by a wire conduit to protect the wiring. Exterior exposed wire connectors shall be positive locking, and environmentally sealed to withstand elements such as temperature extremes, moisture and automotive fluids. Electrical wiring and equipment shall be installed utilizing the following guidelines:

* + - All holes made in the roof shall be caulked with silicon. Large fender washers, liberally caulked, shall be used when fastening equipment to the underside of the cab roof.
    - Any electrical component that is installed in an exposed area shall be mounted in a manner that shall not allow moisture to accumulate in it. Exposed area shall be defined as any location outside of the cab or body.
    - For low cost of ownership, electrical components designed to be removed for maintenance shall be quickly accessible. For ease of use, a coil of wire shall be provided behind the appliance to allow them to be pulled away from the mounting area for inspection and service work.
    - Corrosion preventative compound shall be applied to non-waterproof electrical connectors located outside of the cab or body. All non-waterproof connections shall require this compound in the plug to prevent corrosion and for easy separation of the plug.
    - Any lights containing non-waterproof sockets in a weather-exposed area shall have corrosion preventative compound added to the socket terminal area.
    - All electrical terminals in exposed areas shall have protective coating applied completely over the metal portion of the terminal.
    - Rubber coated metal clamps shall be used to support wire harnessing and battery cables routed along the chassis frame rails.
    - Heat shields shall be used to protect harnessing in areas where high temperatures exist. Harnessing passing near the engine exhaust shall be protected by a heat shield.
    - Cab and crew cab harnessing shall not be routed through enclosed metal tubing. Dedicated wire routing channels shall be used to protect harnessing therefore improving the overall integrity of the vehicle electrical system. The design of the cab shall allow for easy routing of additional wiring and easy access to existing wiring.
    - All standard wiring entering or exiting the cab shall be routed through sealed bulkhead connectors to protect against water intrusion into the cab.

**For maintenance and longevity there shall be no exceptions to this requirement**

# BATTERY CABLE INSTALLATION

All 12-volt battery cables and battery cable harnessing installed by the apparatus manufacturer shall conform to the following requirements:

* + - SAE J 1127 - Battery Cable
    - SAE J 561 - Electrical terminals, eyelets and spade type
    - SAE J 562 - Nonmetallic loom
    - SAE J 836 A - Automotive metallurgical joining
    - SAE J 1292 - Automotive truck, truck-tractor, trailer and motor coach wiring
    - NFPA 1901 - Standard for automotive fire apparatus.

Battery cables and battery cable harnessing shall be installed utilizing the following guidelines:

* + - Splices shall not be allowed on battery cables or battery cable harnesses.
    - For ease of identification and simplified use, battery cables shall be color coded. All positive battery cables shall be marked red in color. All negative battery cables shall be black in color.
    - For ease of identification, all positive battery cable isolated studs throughout the cab and chassis shall be red in color.
    - For increased reliability and reduced maintenance, all electrical buss bars located on the exterior of the apparatus shall be coated to prevent corrosion.
    - An operational test shall be conducted to ensure that any equipment that is permanently attached to the electrical system is properly connected and in working order.

**For maintenance and longevity there shall be no exceptions to this requirement**

# AUTOMATIC HIGH IDLE

This feature automatically increases engine rpm and the available alternator output current. Chassis voltage is monitored at all times by the ES-Key system and when it drops to or below 12.8VDC for more than 10 seconds, the hi-idle output of the ES-Key system is activated. As long as the proper interlocks are present; transmission in NEUTRAL, park brake SET, and additional drive line assessors (Pump & PTO's) are NOT engaged; the engine rpms shall increase to a specified set point. At any time, the ES-Key system's hi-idle command can be canceled by a loss of any of the specified required interlocks. Also at any time, the ES-Key system's hi-idle command can be paused for 30 seconds by a foot brake depression or momentary start switch activation (in the situation where the engine has been off for some time). The ES-Key system's automatic hi-idle command shall remain active until the chassis voltage rises above 12.8VDC and remains there for 3 minutes.

When the hi-idle command is requested by the ES-Key system due to the lower chassis voltage described, the ES-Key dashboard display shall read "Auto Hi-Idle" to clearly indicate to the apparatus operator that the engine is at a, or shall go to, a hi-idle state. When all interlocks are preset, and the engine is at a hi-idle state, the red "FAST IDLE" indicator in the dashboard shall illuminate.

# ALTERNATOR

There shall be a Delco Remy Model 40SI, 320-amp brushless, serpentine belt driven alternator. The brushless design of the 40SI transfers magnetic fields between the rotor and stator air-gap without brushes.

The alternator installation shall be designed to provide maximum output at engine idle speed, by using “Remote Sense” in order to meet the minimum continuous electrical load of the apparatus as required.

The alternator shall carry a 3 Year/Unlimited Mile warranty.

# BATTERY SYSTEM

Three (3) Odyssey #PC2150/31S, Group 31 Absorbed Glass Mat, maintenance free batteries shall be provided. Each battery shall be rated at 1,150 CCA at 0° F and shall have a reserve capacity of 205 minutes.

Wiring for the batteries shall be 4/0 welding type dual path starting cables for SAEJ541.

# BATTERY STORAGE

Batteries shall be securely mounted in a fixed 3/16” GR50 steeltray, located on the driver's side of the chassis frame. Complete access shall be provided when the cab is fully tilted. Batteries shall be mounted on non-corrosive matting material.

The battery tray shall be able to withstand a longitudinal acceleration of -46.5g at 0.246 seconds in accordance to SAE J211 standards using a channel frequency class 600 filter. Testing shall be performed at and verified by a third-party testing and evaluation center.

**For maintenance and longevity there shall be no exceptions to this requirement**

# BATTERY DISCONNECT SWITCH

The chassis batteries shall be wired in parallel to a single 12-volt electrical system, controlled through a heavy-duty master disconnect switch. The master disconnect switch shall be located within easy access of the driver upon entering or exiting the cab.

# BATTERY JUMPER STUDS

A set of Cole Hersee battery jumper studs, model #46210-02 (red) and #46210-03 (black) shall be provided to allow the battery system to be jump started or charged from an external source. The studs shall be located on the bottom of the battery box on the driver's side of the chassis. Each stud shall be equipped with both a rubber protector cap and a 2” square non-conductive plate to prevent accidental shorting.

# 120 VOLT SHORELINE CONNECTION - "SUPER" AUTO EJECT

One (1) Kussmaul "Super" Auto Eject model 091-55-20-120, automatic, 120-volt, 20-amp shoreline disconnect shall be provided for the on board, 120-volt battery charging systems.

The disconnect shall be equipped with a NEMA 5-20 P male receptacle, which shall automatically eject the shoreline when the vehicle starter is energized. The mating connector shall be included with the auto eject and shall be provided as loose equipment. A label shall be provided indicating voltage and amperage ratings.

# SHORELINE POWER INLET PLATE

A shoreline power receptacle information plate shall be permanently affixed at or near the power inlet. The plate shall indicate the following:

* + - Type of Line Voltage
    - Current Rating in Amps Power Inlet Type (DC or AC).

The Kussmaul auto-eject connection shall be equipped with a Red weatherproof cover.

The shoreline receptacle shall be located on the bumper extension gravel shield, on the driver's side in a pre-determined location by The Bidder.

# BATTERY CHARGER SYSTEM

A Kussmaul model # 091-187-12-REMOTE, "Auto Charge 1200" high output, fully automatic battery charger shall be provided for maintaining the vehicle battery system. Unique electronic sensing circuits sense the true battery voltage while eliminating the need for external sense wires. Output current shall be 40 amperes @ 12-volt DC.

A LED bar graph display shall be located near the shoreline connection to monitor the battery status.

# SHORELINE RECEPTACLE

Two (2) 120-volt 5-15 R household type receptacle(s) shall be located in the specified body compartment as directed. The receptacle(s) shall be wired into the shoreline receptacle to provide a 120-volt power source for fire department equipment.

# SHORELINE POWER STRIP

A 120-volt household type power strip shall be located as directed in the rear crew area of the cab. The power strip shall be equipped with a minimum of six (6) outlets. The power strip shall be wired into the shoreline receptacle to provide a 120-volt power source for fire department equipment.

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# OUTLET STRIP

One (1) 3' long 110V outlet strip shall be installed on the rear of the doghouse. Each outlet strip shall have four (4) duplex household receptacles.

# EMERGENCY/AUXILIARY SWITCHES

Switching for the emergency and auxiliary systems shall be performed through the multiplex control screen. Switching shall programmed through various menus that are accessible from the display buttons.

**Any deviation or exceptions of material, dimensions or performance must be clearly identified as an exception and explained on the exceptions page.**

# LED CAB INTERIOR LIGHTING

Four (4) Weldon 8080-8001-13 interior LED combination red/white dome lights shall be furnished in the cab, two (2) in the forward section and two (2) in the rear crew section. Each dome light shall have an integral selector switch. Each dome light shall also activate when the respective, adjacent cab door is opened.

# "DO NOT MOVE APPARATUS" WARNING LIGHT

A 1" round, red flashing warning light with an integral audible alarm shall be functionally located in the cab to signal when an unsafe condition is present; such as an open cab or body compartment door, an extended ladder rack, a deployed stabilizer, an extended light tower or any other device that may be opened, extended or deployed and might cause damage to the apparatus if it is moved.

This light shall be activated through the parking brake switch to signal when the parking brake is released. This light shall be labeled "DO NOT MOVE TRUCK".

# ADDITIONAL DOOR OPEN INDICATOR

One (1) Floyd Bell, Twin Turbo, audio/visual warning light/ audio alarm shall be provided and installed to indicate an open cab or body door. The warning light / audio alarm shall be installed on the cab dash, visible to the driver & officer. An ID tag shall be provided and labeled with "Door Indicator".

# 12 VOLT POWER PORT NEAR DRIVER

One (1) 12-volt power port accessory outlet(s) shall be installed in the cab of the truck for the fire departments accessory devices. The port(s) shall be located as directed near the driver's seating position for devices such as cellular phones.

# 12 VOLT POWER PORT NEAR OFFICER

One (1) 12-volt power port accessory outlet(s) shall be installed in the cab of the truck for the fire departments accessory devices. The port(s) shall be located as directed near the officer's seating position for devices such as cellular phones.

# 12 VOLT POWER PORTS - REAR FACING SEAT BASES

Two (2) 12-volt power port accessory outlets shall be installed in the cab of the truck for fire department accessory devices. The ports shall be located in the rear crew area, one (1) in each rear facing seat base.

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# USB CHARGING PORT NEAR DRIVER

One (1) Kussmaul USB charging port(s) shall be installed in the cab of the truck for the fire departments accessory devices. Each port shall have two (2) USB connections and shall have a 5-volt, 4.2-amp max output. The port(s) shall be located as directed near the driver's seating position for devices such as cellular phones.

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# USB CHARGING PORT NEAR OFFICER

One (1) Kussmaul USB charging port(s) shall be installed in the cab of the truck for the fire departments accessory devices. Each port shall have two (2) USB connections and shall have a 5-volt, 4.2-amp max output. The port(s) shall be located as directed near the officer's seating position for devices such as cellular phones.

# USB CHARGING PORTS - REAR FACING SEAT BASES

Two (2) Kussmaul USB charging ports shall be installed in the cab of the truck for fire department accessory devices. Each port shall have two (2) USB connections and shall have a 5-volt, 4.2-amp max output. The ports shall be located in the rear crew area, one (1) in each rear facing seat base.

# 12 VOLT ACCESSORY CIRCUIT - CAB DASH

One (1) dedicated circuit; 12-volt, 40 Amp, power and ground on 3/8 stud and fused at battery shall be provided in the cab dash. The circuit shall be for future installation of radios or accessories.

# BLUE SEA FUSE BLOCK - 12 CIRCUIT IN REAR CREW AREA

A Blue Sea 5026B, 12 circuit fuse block, shall be installed behind the officer’s seat. This block has a maximum amperage of 60 Amps per block and 30 Amps per circuit.

# MULTI - USE POWER POINT IN REAR OF CAB

A Mobile Vision (Magnadyne DVU-3G2) multi-use power point with built in two (2) USB ports, and two (2) 12-volt sockets shall be installed in the rear of the cab on the back of the engine enclosure. This shall be capable of supplying the USB ports with up to three (3) amps and have a 15-amp fuse for overall protection.

# IGNITION STUD - REAR CREW AREA

An ignition stud shall be installed in the rear crew area for items needing an ignition circuit ( i.e. mobile radio). This stud has a maximum amperage of 20 Amps.

# HEADLIGHTS CLUSTER

Two (2) dual, J.W. Speaker LED headlight modules with a bright finish bezel shall be furnished, one (1) each side, on the front of the cab. Each head light module shall incorporate an individual LED low beam and a LED high beam headlight. High beam actuation shall be controlled on the turn signal lever.

# DAYTIME RUNNING LIGHTS

The chassis head lights shall have integrated circuitry to actuate the low beam headlights at a maximum of 80 percent of capacity whenever the chassis engine is running.

The daytime running lights shall be interlocked with the parking brake.

# SECONDARY DUAL LIGHT MODULE

Two (2) Code 3 65STA arrow shaped, amber LED turn signals shall be provided, one (1) in each side of the dual light module above the headlights.

The NFPA required, Zone "A" lower warning lights shall be incorporated into each side dual light module noted above.

# DOT MARKER LIGHTS AND REFLECTORS

The Five (5) DOT approved Light Emitting Diode (LED) cab marker lamps shall be included in the Hi-Viz FireTech LED brow light.

Optronics Model MCL48 amber LED marker lights with chrome bezel shall be provided on the side of the cab behind the front cab doors, one (1) each side.

Optronics model MCL82RB red LED marker lights with integral reflectors shall be provided at the lower side rear, one (1) each side.

Optronics Model #STL71AMB yellow LED side marker and turn lights shall be provided on the apparatus lower side, forward of rear axle, one (1) each side if the apparatus is 30' long or longer.

Optronics MCL65 red LED clearance lights shall be provided on the apparatus rear upper, one (1) each side at the outermost practical location.

Optronics MCL12 LED 3-lamp identification bar will be provided on the apparatus rear center. The lights shall be red in color.

Truck-Lite # 98034Y yellow reflectors shall be provided on the apparatus body lower side, as far forward and low as practical, one (1) each side if the apparatus is 30' long or longer.

Truck-Lite # 98034R red reflectors shall be provided on the apparatus rear, one (1) each side at the outermost practical location.

Truck-Lite # 98034Y yellow reflectors shall be provided on the side of the cab lower side, as far forward and low as practical, one (1) each side.

# LED LICENSE PLATE LIGHT - REAR

One (1) Tecniq model #L10 LED license plate light shall be provided above the mounting position of the license plate. The light shall be clear in color and shall have a chrome finish.

# TAIL, STOP, TURN AND BACK-UP LIGHTS

Two (2) Code 3, 65STR 4" x 6", red LED combination tail and stop lights, shall be mounted one each side at the rear of the body.

Two (2) Code 3, 65STA 4" x 6", amber LED arrow turn signal lights, shall be mounted one each side, on a vertical plane with the tail/stop lights.

Two (2) Code 3, 65RV 4" x 6", white LED backup lights, shall be mounted one each side, on a vertical plane with the turn/tail/stop signals. These lights shall activate when the transmission is placed in reverse gear.

Two (2) Code 3 65STK4 mounting flanges, installed one (1) on each side, shall be provided to mount the lights described above in one common mounting flange. The fourth opening shall be for the lower rear warning lights.

The lights shall be mounted in order, from top to bottom, as described above.

# CAB STEP LIGHTS

Chrome plated Innovative Lighting, 3-LED surface mounted, chassis step lights shall be provided and controlled with marker light actuation. Step lights shall be located to properly illuminate all chassis access steps and walkway areas.

# BODY STEP LIGHTS

Chrome plated Innovative Lighting, 3-LED surface mounted, body step lights shall be provided and controlled with marker light actuation. Step lights shall be located to properly illuminate all body access steps and walkway areas.

# DUNNAGE AREA LIGHTING

Two (2) stainless steel, TecNiq Eon 3-LED horizontal surface mounted lights shall be provided in the dunnage area to provide adequate illumination of this area. These lights shall be switched in the same manner as the step lights.

# HOSE BED LIGHTS

One (1) Amdor LED strip surface mounted lights shall be mounted in the hose bed on the front wall to illuminate the hose bed area.

# HOSE BED WORK LIGHT - SWITCH

The hose bed work light shall have a protected 12-volt switch at the rear body panel. The switch will be labeled "HOSE BED WORK LIGHTS".

# SCENE LIGHTS - REAR OF BODY

Two (2) Code 3 #79SCBZ LED scene lights shall be provided, one on each side of the rear body panel in a chrome plated flange. The scene lights shall be wired through the load management system.

# SCENE LIGHTS - DRIVER SIDE OF BODY

Two (2) Code 3 #79SCBZ LED scene lights shall be provided. The scene lights shall be installed one rearward and one forward on the driver side of the body in a chrome plated flange. The scene lights shall be wired through the load management system.

# SCENE LIGHTS - OFFICER SIDE OF BODY

Two (2) Code 3 #79SCBZ LED scene lights shall be provided. The scene lights shall be installed one rearward and one forward on the officer side of the body in a chrome plated flange. The scene lights shall be wired through the load management system.

# REAR OF BODY LIGHT SWITCHING - CAB

A switch shall be provided in the cab warning light switch console to turn the rear of body lights on and off.

# DRIVER SIDE OF BODY LIGHT SWITCHING - CAB

A switch shall be provided in the cab warning light switch console to turn the driver side of body lights on and off.

# OFFICER SIDE OF BODY LIGHT SWITCHING - CAB

A switch shall be provided in the cab warning light switch console to turn the officer side of body lights on and off.

# REAR SCENE LIGHTS - ADDITIONAL ACTIVATION

In addition to the cab mounted switch for the rear scene lights, the rear scene lights shall illuminate when the transmission is placed in reverse gear and the apparatus is operating as an emergency vehicle (Primary Warning switch on).

# GROUND LIGHTS - CAB

One (1) Amdor Luma Bar H2O LED 20" ground light shall be provided under each side cab door entrance step, four (4) total. The ground lights shall turn on automatically with each respective door jamb switch and also by a master ground light switch in the warning light switch console.

Each light shall illuminate an area at a minimum 30" outward from the edge of the vehicle.

# GROUND LIGHTS - FRONT BUMPER

One (1) Amdor Luma Bar H2O LED 12" ground light shall be provided under each side of the front bumper facing forward, two (2) total. The ground lights shall be activated by a master ground light switch in the cab and shall be wired through the load management system.

# GROUND LIGHTS - PUMP PANEL

One (1) Amdor Luma Bar H2O LED 20" ground light shall be provided under each side pump panel running board, two (2). The ground lights shall be activated by a master ground light switch in the cab and shall be wired through the load management system.

# GROUND LIGHTS - REAR BODY SIDES

One (1) Amdor Luma Bar H2O LED 20" ground light shall be provided under each body side rear compartment, total of two (2). The ground lights shall be activated by a master ground light switch in the cab and shall be wired through the load management system.

# GROUND LIGHTS - FRONT BODY

One (1) Amdor Luma Bar H2O LED 20" ground light shall be provided under each front body corner, two (2) total. The ground lights shall be activated by a master ground light switch in the cab and shall be wired through the load management system.

# GROUND LIGHTS - REAR

One (1) Amdor Luma Bar H2O LED 20" ground light shall be provided under each rear body facing rearward, two (2) total. The ground lights shall be activated by a master ground light switch in the cab and shall be wired through the load management system.

# GROUND LIGHT ACTIVATION

The cab and body ground lights shall activate by engaging the parking brake.

# GROUND LIGHT SWITCHING

The cab and body ground lights shall be equipped with an activation switch in the cab.

# LED BROW LIGHT - ABOVE WINDSHIELD

One (1) Hi-Viz LEDs "FireTech" Scene light model FT-B-72-ML-B shall be provided. The light instrument shall be low in profile with a mounting bracket allowing installation at the top edge of the windshield. The housing shall be made of extruded 6061 aluminum; 72" wide and less than 3" tall.

The scene light shall have 57 LEDs divided amongst 3 independent circuits; circuit one featuring 9x 5w LEDs passing light through a 10-degree optic, circuit two featuring 18x 5w LEDs passing light through a 25-40 degree "flood" range, and circuit three featuring 30x 5w LEDs passing light through a 60-90 degree "scene" optic. Circuit four shall consist of 5 amber colored diodes that act as SAE-J2042 compliant clearance marker and identification lamps.

The circuitry shall feature a PWM LED driver with an onboard electronic thermal manager. Additionally, the bar shall meet CISPR25 EMI requirements. The light shall operate on 12v DC, generate 28,101 lumens and draw 24 amps.

The light shall be adjustable vertically up to 15 degrees. Mounting shall be possible in any direction while still meeting NFPA 1901 compliance requirements. The housing color shall be Black.

# TWO (2) HI-VIZ BROW LIGHTS, LEFT AND RIGHT FRONT CORNERS

Two (2) Fire Tech, Hi-Viz LED scene lights, model FT-MB-12-TR, shall be mounted on the top of the cab, on the forward outer corners. The lights shall be mounted on a 45-degree angle. The housings shall be black.

The lights shall be controlled by left and right individual switches in the cab switch panel. Pictures of the last unit will be provided for location of switches. NOTE: These switches shall also operate the alley lights in the lightbar for the respective side.

# TWO (2) HI-VIZ SIDE BROW LIGHTS, LEFT AND RIGHT-SIDE CAB

Two (2) Fire Tech, Hi-Viz LED scene lights, model FT-MB-12-TR, shall be mounted on the side top of the cab, on the vista roof portion. The lights shall be mounted to shine outboard when any cab door is opened. The housings shall be black.

The lights shall be controlled by left and right individual switches in the cab switch panel as well as activation when any cab door is opened.

# CAB SCENE LIGHTS - ADDITIONAL ACTIVATION

In addition to the cab mounted switch for the cab scene lights, the driver and officer cab doors shall activate the respective light when a cab door is opened.

# LIGHT ABOVE WINDSHIELD SWITCHING - CAB

Three (3) switches shall be provided in the cab warning light switch console to control the individual lighting circuits of the Hi-Viz FireTech LED brow light.

# LIGHTS AT CAB ROOF CORNERS SWITCHING - CAB

Two (2) switches shall be provided in the cab warning light switch console to turn the lights at the cab roof corners on and off. One (1) switch shall control the driver side light and one (1) switch shall control the officer side light. NOTE: These switches shall also control the alley lights in the light bar for the respective side.

# LIGHTS AT SIDE ROOF SWITCHING - CAB

Two (2) switches shall be provided in the cab warning light switch console to turn the lights at each side of the cab on and off. One (1) switch shall control the driver side light and one (1) switch shall control the officer side light.

# \*\*\*\* BODY ELECTRICAL SYSTEM \*\*\*\*

# 12 VOLT BODY ELECTRICAL SYSTEM

All electrical lines in the body shall be protected by automatic circuit breakers, conveniently located to permit ease of service. Flashers, heavy solenoids and other major electrical controls shall be located in a central area near the circuit breakers.

All lines shall be color and function coded every 3", easy to identify, oversized for the intended loads and installed in accordance with a detailed diagram. A complete wiring diagram shall be supplied with the apparatus.

Wiring shall be carefully protected from weather elements and snagging. Heavy duty loom shall be used for the entire length. Grommets shall be utilized where wiring passes through panels.

In order to minimize the risk of heat damage, wires run in the engine compartment area shall be carefully installed and suitably protected by the installation of heat resistant shielded loom.

All electrical equipment shall be installed to conform to the latest federal standards as outlined in NFPA 1901.

**Any deviation or exceptions of material, dimensions or performance must be clearly identified as an exception and explained on the exceptions page.**

# POWER DISTRIBUTION MODULES

Class 1 Power distribution modules shall be provided in strategic areas of the chassis to allow body harnesses to interface to multiplex system.

The Remote Power Modules (RPM) provide a method of controlling loads on the vehicle, outside the cab, without running individual wires from each switch to the load. This electronic module distributes and controls power to various devices on the vehicle as commanded by the control system inside the cab.

The RPM is connected to the Electrical System Controller via the J1939 datalink. Each module receives power from a power cable, protected by a fusible link to the main battery circuit.

The power distribution modules shall be mounted in a location to provide complete access for service or trouble shooting.

# PUMP ENCLOSURE WORK LIGHTS

Two (2) Tecniq model #E18 lights shall be provided inside the pump enclosure providing 800 lumens each. Each light shall have their own independent switch incorporated into the light head.

# ENGINE COMPARTMENT WORK LIGHTS

Two (2) Tecniq model #E18 LED lights shall be provided inside the engine enclosure that will provide 800 lumens each. Each light shall have their own independent switch incorporated into the light head.

# COMPARTMENT LIGHT ACTIVATION

Compartment lighting shall be switched either from an integral switch as provided by the roll up door manufacturer or a magnetic proximity switch if it is a The Bidder manufactured door.

# AMDOR LUMA BAR COMPARTMENT LIGHTS - DUAL

Each individual, equipment storage compartment shall be equipped with the AMDOR Luma Bar LED light fixture mounted one each side of the forward and rear vertical door frame.

# TELESCOPING 220W AKRON LED FLOODLIGHTS – TOP MOUNT

Two (2) Akron Scene Star, 220-watt, 12 volt led flood lights shall be installed, one (1) each side, through the top mount control panel, each using an Extenda-Lite, pull up, telescoping pole.

Each lamp head shall draw 18 amps and generate 19,000 lumens. Each light shall be switched at the light head.

Telescoping lights to be integrated to the door ajar system

# TOP MOUNT LIGHT SWITCHING - PUMP PANEL

Two (2) switches shall be provided on the pump panel to turn the top mount lights on and off. One (1) switch shall control the driver side light and one (1) switch shall control the officer side light.

# NFPA AUDIBLE AND LIGHTING WARNING PACKAGE

The following warning light package shall include all of the minimum warning light and actuation requirements for the current revision of the NFPA 1901 Fire Apparatus Standard. The lighting as specified shall meet the requirements for both "Clearing Right of Way" and "Blocking Right of Way" which includes disabling all white warning lights when the apparatus is in "Blocking Right of Way" mode.

# LIGHT PACKAGE ACTUATION CONTROLS

The entire warning light package shall be actuated with a single warning light switch located on the cab switch panel. The wiring for the warning light package shall engage all of the lights required for "Clearing Right of Way" mode when the vehicle parking brake is not engaged. An automatic control system shall be provided to switch the warning lights to the "Blocking Right of Way" mode when the vehicle parking brake is engaged.

# WARNING LIGHT FLASH PATTERN

All of the perimeter warning lights shall be set to a default NFPA compliant flash pattern as provided by the light manufacturer.

# WARNING LIGHT SYNCHRONIZATION

The perimeter warning lights shall be synchronized so the lights shall flash in a consistent alternating pattern.

The following lights shall be synchronized:

# 

# UPPER LEVEL LIGHTING - CODE 3

# NFPA ZONE A, UPPER

A Code 3 DF82ANFPA1 "Defender Quad-Core Series", 82" LED cab roof warning light bar shall be furnished and rigidly mounted on top of the cab roof.

The light bar shall be equipped with the following:

* + - Clear Lenses with a Black Top
    - Twelve Forward Facing Red - QuadCore 6 LED Red Modules
    - Four Corners – QuadCore 6 LED Red Modules

If equipped, the forward facing white lights shall be automatically disabled for the "Blocking Right of Way" mode.

The Defender light bar shall be equipped with a pair of TriCore alley lights.

The Defender light bar shall be equipped with a 795H Opticom emitter. The emitter shall be disabled automatically for the "Blocking Right of Way" mode.

# NFPA ZONE C, UPPER

Two (2) Code 3 85BZ\* LED lights shall be furnished and mounted one (1)each side at the rear, upper portion of the apparatus.

Each light head shall be equipped with red LEDs and a colored lens.

The lights shall be installed with a chrome plated mounting flange.

# NFPA ZONES B & D REAR, UPPER

Two (2) surface mounted Code 3 85BZ\* LED light heads shall be furnished and mounted one (1) each side on the upper side face, towards the rear of the body, facing to each side of the unit.

Each light head shall be equipped with red LEDs and a colored lens.

The lights shall be installed with a chrome plated mounting flange.

# NFPA ZONES B & D FRONT, UPPER

The lighting requirement for this area is covered by the lights noted in Zone "A" - Upper.

# LOWER LEVEL LIGHTING - CODE 3

# NFPA ZONE A, LOWER

Two (2) Code 3 65BZ\* LED light heads shall be provided and installed one (1) each side.

Each light head shall be equipped with red LEDs and a colored lens.

The lights shall be installed with a chrome plated mounting flange.

The lower Zone A warning lights shall be mounted in the custom chassis headlight bezels.

# NFPA ZONE C, LOWER

Two (2) Code 3 65BZ\* LED light heads shall be provided and installed; one (1) each side directly below the DOT stop, tail, turn and backup lights.

Each light head shall be equipped with red LEDs and a colored lens.

The lights shall be installed with a chrome plated mounting flange.

# NFPA ZONES B & D FRONT, LOWER

Two (2) Code 3 65BZ\* LED light heads shall be provided and installed one (1) each side.

Each light head shall be equipped with red LEDs and a colored lens.

The lights shall be installed with a chrome plated mounting flange.

The lower Zone B & D warning lights shall be mounted on the sides of the custom chassis front bumper.

# NFPA ZONES B & D MIDSHIP, LOWER

Two (2) Code 3 65BZ\* LED light heads shall be provided and installed one (1) each side.

Each light head shall be equipped with red LEDs and a colored lens.

The lights shall be installed with a chrome plated mounting flange.

# NFPA ZONES B & D REAR, LOWER

Two (2) Code 3 45BZ\* LED light heads shall be provided and installed one (1) each side.

Each light head shall be equipped with red LEDs and a colored lens.

The lights shall be installed with a chrome plated mounting flange.

# WARNING LIGHT SYSTEM CERTIFICATION

The warning light system(s) specified above shall not exceed a combined total amperage draw of 45 AMPS with all lights activated in either the "Clearing Right of Way" or the "Blocking Right of Way" mode.

The warning light system(s) shall be certified by the light system manufacturer(s), to meet all of the requirements in the current revision of the NFPA 1901 Fire Apparatus Standard as noted in the General Requirements section of these specifications. The NFPA required "Certificate of Compliance" shall be provided with the completed apparatus.

Any large truck as defined by NFPA shall have the lower zone warning lights mounted no higher than 62" to the optical center of the warning light from ground level.

# ALTERNATING FLASHING HEADLIGHT SYSTEM

An alternating flashing wig-wag system, wired to the apparatus headlights, shall be installed. The wig-wag system shall be individually switched at the master light console. The alternating flashing system shall be automatically disabled during the "Blocking Right of Way" mode.

# \*\*\*\*\* AUDIBLE WARNING EQUIPMENT \*\*\*\*\*

# ELECTRIC HORN

# A single electric horn activated by the steering wheel horn button shall be furnished.

A three (3) position rocker switch shall be installed on the cab dash to activate from the steering wheel horn button one of the following: DOT horn, air horn, or electronic/mechanical siren.

# BACK-UP ALARM

A Code 3, model # CA278, 87dBA back-up alarm, shall be provided and installed at the rear of the apparatus under the tailboard. The back-up alarm shall activate automatically when the transmission is placed in reverse gear and the ignition is "on".

# AIR HORNS

Two (2) chrome plated air horns shall be at the front of the vehicle. The air horns shall be mounted in full compliance with NFPA-1901. The supply lines shall be dual 1/4" lines with equal distance from each horn.

Both air horns shall be recessed in the front bumper.

The air horn(s) shall be controlled by a push button located on the dash, on the officer's side and the steering horn button for the driver. An air horn/ electric DOT horn selector switch shall be furnished on the dash for the drivers steering horn button.

# ELECTRONIC SIREN AND SPEAKER

One (1) Whelen # 295HFS2, 100-watt electronic siren shall be provided featuring: flush mount remote control head recessed in center dash panel as space allows, "Si-Test" self-diagnostic feature, six (6) function siren, radio repeat and public address.

The electronic siren and speaker shall meet the NFPA required SAE certification to ensure compatibility between the siren and speaker.

One (1) Whelen, model # SA315P composite black siren speaker, shall be provided, recessed in the front bumper and wired to the electronic siren.

# FEDERAL Q2B MECHANICAL SIREN

One (1) Federal Model #Q2B mechanical siren shall be provided to provide audible warning.

The Q2B siren shall be pedestal mounted on top of the extended bumper on the driver's side. The siren shall be equipped with a Federal model #P, chrome housing and pedestal.

A floor mounted foot switch shall be provided for the officer. A siren brake button shall be provided near the driver's position.

A rocker switch shall be installed in the dash panel to allow control of either the air horn or the siren from the steering wheel horn button for the driver.

# FIRECOM MODEL #5100D DIGITAL WIRELESS INTERCOM SYSTEM

A FireCom model # 5100D digital intercom system shall be provided in the front of the cab. The system shall be capable of interfacing with a two-way radio system (note: an authorized two-way radio installer shall be responsible for interfacing the intercom system with the two-way radio).

The 5100D master station shall have the following features:

* + - Single radio monitor and transmit selector switch
    - Touch-pad adjustable volume and squelch
    - Advanced digital signal processing noise-reduction
    - Single auxiliary input/output connection
    - Nominal 12v power supply
    - Six (6) jacks for wireless base stations and/or wired headset connections; expandable up to twelve (12) daisy-chained wired headsets

The intercom system shall include:

# DRIVERS AND OFFICER HEADSETS & BASE STATION FOR FIRECOM SYSTEM

Two (2) UHW-505 wireless under helmet radio transmit headsets, shall be furnished for the driver and officer seating locations in the cab. The headsets shall have adjustable volume, noise-canceling electric microphone, adjustable head strap, a flex-style boom which rotates for left or right dress and a charging port to connect the 12-volt charger when the headset is not in use. The sets shall also have comfortable ComLeather ear seals.

One (1) wireless base station WB505R shall be connected via a 6-conductor flat RJ-6 cable to any headset port on the FireCom 5100D series intercom. The base station will provide full duplex audio communication between the wireless headset and the intercom as well as PTT communication through the apparatus mobile radio.

Two (2) 108-0678-00 yellow, NFPA compliant, rubber coated steel headset hanger hooks shall be furnished in the front section of the cab to hold the driver and offer intercom headsets while not in use.

# FIRECOM REMOTE HEAD

A 5100DRH remote head shall be surface mounted in the cab as directed by the fire department. The remote head shall have the same controls as the master base station.

# RADIO INTERFACE CABLE

One (1) radio interface cable, model # 110-5101-30 and one (1) extension cable model # 108-0086-00 shall be provided and installed from the FireCom base unit to the area of where the mobile radio base station shall be mounted. The end of the cable that connects to the mobile radio shall be un-terminated and shall be the responsibility of the radio installer to provide and install the correct adapter to connect the cable to the mobile radio.

# REAR JUMPSEAT HEADSETS

Three (3) UHW-503 wireless under helmet intercom headsets shall be furnished for three (3) rear jump seat locations. The intercom headsets shall have adjustable volume, noise-canceling electric microphone, adjustable head strap, a flex-style boom which rotates for left or right dress and a charging port to connect the 12-volt charger when the headset is not in use. The sets shall also have comfortable ComLeather ear seals.

# WIRELESS BASE STATION

One (1) wireless, multiple user, base station shall be provided and connected via a 6-conductor flat RJ-6 cable to any headset port on the main FireCom base station. The wireless base station shall provide full duplex audio communication between the wireless headset and the intercom.

Three (3) yellow, NFPA compliant, rubber coated steel headset hanger hooks shall be furnished to hold the intercom headsets while not in use.

# 

# WEATHER BAND AM/FM/CD RADIO

A Weather Band/AM/FM, CD, MP3, Satellite ready player with a wireless remote shall be installed in the cab overhead panel as space allows. The speakers shall be located as follows:

* + - (2) 6 inch mounted in the Front of the cab
    - (2) 6 inch mounted in the Rear of the cab

A heavy duty flexible base antenna shall be provided on the cab.

A master cut-off switch shall be provided near the driver's position to allow the electric power to the specified stereo system to be shut off.

# \*\*\*\* PUMP AND PLUMBING \*\*\*\*

# PUMP

* **HALE QMAX-175**
* **1750 G.P.M.**
* **Single Stage**

The pump must deliver the percentage of rated capacity at the pressure listed below:

* 100% of rated capacity at 150 P.S.I. net pump pressure
  + 100% of rated capacity at 165 P.S.I. net pump pressure
  + 70% of rated capacity at 200 P.S.I. net pump pressure
  + 50% of rated capacity at 250 P.S.I. net pump pressure.

# PUMP ASSEMBLY

The pump shall be of a size and design to mount on the chassis rails of commercial and custom truck chassis, and have the capacity of 1750 gallons per minute (U.S. GPM), NFPA-1901 rated performance.

# PUMP CONSTRUCTION

The entire pump shall be manufactured and tested at the pump manufacturer's factory.

The pump shall be driven by a drive line from the truck transmission. The engine shall provide sufficient horsepower and RPM to enable the pump to meet and exceed its rated performance.

The entire pump, both suction and discharge passages, shall be hydrostatically tested to a pressure of 600 PSI. The pump shall be fully tested at the pump manufacturer's factory to performance specs as outlined by the latest NFPA-1901. Pump shall be free from objectionable pulsation and vibration.

The pump body and related parts shall be of fine grain alloy cast iron with a minimum tensile strength of 30,000 PSI. All moving parts in contact with water shall be of high quality bronze or stainless steel. Pumps utilizing castings made of lower tensile strength cast iron are not acceptable.

Pump body shall be horizontally split, on a single plane in two sections for easy removal of entire impeller assembly including wear rings and bearings from beneath the pump without disturbing piping or the mounting of the pump in chassis.

# PUMP SHAFT

Pump shaft to be rigidly supported by three bearings for minimum deflection. One high lead bronze sleeve bearing shall be located immediately adjacent to the impeller (on side opposite the gearbox). The sleeve bearing is to be lubricated by a force fed, automatic oil lubricated design, pressure balanced to exclude foreign material.

The pump shaft shall be heat-treated, electric furnace, corrosion resistant stainless steel to be super-finished under packing with galvanic corrosion (zinc foil separators in packing) protection for longer shaft life. Pump shaft must be sealed with double-lip oil seal to keep road dirt and water out of gearbox.

# PUMP IMPELLER

The pump shall have one double suction impeller. The pump body shall have two opposed discharge volute cutwaters to eliminate radial unbalance. (No exceptions)

Pump impeller shall be hard, fine grain bronze of the mixed flow design; accurately machined and individually balanced. The vanes of the impeller intake eyes shall be of sufficient size and design to provide ample reserve capacity utilizing minimum horsepower.

Impeller clearance rings shall be bronze, easily renewable without replacing impeller or pump volute body, and of wrap-around double labyrinth design for maximum efficiency.

# MECHANICAL SHAFT SEAL

The mid ship pump shall be equipped with a high quality, spring loaded, self-adjusting mechanical seal capable of providing a positive seal to atmosphere under all pumping conditions. This positive seal to atmosphere must be achievable under vacuum conditions up to 26 Hg (draft) or positive suction pressures up to 250 PSI.

The mechanical seal assembly shall be 2 inches in diameter and consists of a carbon sealing ring, stainless steel coil spring, Viton rubber boot, and a tungsten carbide seat with a Teflon backup seal provided.

Only one (1) mechanical seal shall be required, located on the first stage suction (inboard) side of the pump and be designed to be compatible with a one-piece pump shaft. A continuous cooling flow of water from the pump shall be directed through the seal chamber when the pump is in operation.

# PUMP DRIVE UNIT

The drive unit shall be completely assembled and tested at the pump manufacturer's factory.

Pump drive unit shall be of sufficient size to withstand up to 16,000 lbs. ft. of torque of the engine in both road and pump operating conditions. The drive unit shall be designed of ample capacity for lubrication reserve and to maintain the proper operating temperature.

The gearbox drive shafts shall be of heat treated chrome nickel steel and at least 2-3/4 inches in diameter on both the input and output drive shafts. They shall withstand the full torque of the engine in both road and pump operating conditions.

All gears, both drive and pump, shall be of the highest quality electric furnace chrome nickel steel. Bores shall be ground to size and teeth integrated, chrome-shaven and hardened, to give an extremely accurate gear for long life, smooth, quiet running and higher load carrying capability. An accurately cut spur design shall be provided to eliminate all possible end thrust.

# PUMP RATIO

The pump ratio shall be selected by the apparatus manufacturer to give maximum performance with the engine and transmission selected.

The manufacturer shall supply at time of delivery copies of the pump manufacturer's certification of hydrostatic testing, the engine manufacturer's current certified brake horsepower curve.

# PUMP SHIFT CONTROL

The drive unit shall be equipped with a power shift. The shifting mechanism shall be a heat treated, hard anodized aluminum power cylinder with stainless steel shaft. An in-cab control for rapid shift shall be provided that locks in road or pump, with a manual override is required.

# EMERGENCY PUMP SHIFT

An emergency manual pump shift control shall be furnished on the left side pump panel which may be utilized if the air shift control does not operate.

A transmission, manual lock-up switch shall be furnished in the cab to ensure positive lock-up of the transmission.

# MAIN PUMP - PUMP SHIFT INDICATOR LIGHTS

For automatic transmissions, three (3) green warning lights shall be provided to indicate to the operator(s) when the pump has completed the shift for Road to Pump position. Two (2) green lights to be located in the truck driving compartment and one (1) green light on pump operator's panel adjacent to the throttle control. For manual transmissions, one (1) green warning light shall be provided for the driving compartment. All lights to have appropriate identification/instruction plates.

# TRANSMISSION LOCK

The automatic transmission furnished in the chassis shall have a lock-up assembly which brings the transmission to direct drive and prevents the transmission from shifting gears while in the pumping mode.

# BRAKING SYSTEM

A positive braking system shall be provided to prevent vehicle movement during pumping operations. The air brakes furnished must satisfy this requirement.

# MAIN PUMP MOUNTS

Extra heavy-duty pump mounting brackets shall be furnished. These shall be bolted to the frame rails in such a position to perfectly align the pump so that the angular velocity of the drive line joints shall be the same on each end of the drive shaft. This shall assure full capacity performance with a minimum of vibration. Mounting hardware shall utilize Grade 8 bolts.

# \*\*\*\*\* PRESSURE CONTROL & ACCESSORIES \*\*\*\*\*

# FIRE RESEARCH "IN-CONTROL" PRESSURE GOVERNOR

The apparatus shall be equipped with a Fire Research InControl series TGA400 pressure governor and monitoring display kit shall be installed. The kit shall include a control module, intake pressure sensor, discharge pressure sensor, and cables. The control module case shall be waterproof and have dimensions not to exceed 5 1/2" high by 10 1/2" wide by 2" deep. The control knob shall be 2" in diameter with no mechanical stops, have a serrated grip, and a red idle push button in the center. It shall not extend more than 1 3/4" from the front of the control module. Inputs for monitored information shall be from a J1939 databus or independent sensors. Outputs for engine control shall be on the J1939 databus or engine specific wiring.

The following continuous displays shall be provided:

* + Pump discharge; shown with four daylight bright LED digits more than 1/2" high.
    - Pump Intake; shown with four daylight bright LED digits more than 1/2" high.
    - Pressure / RPM setting; shown on a dot matrix message display.
    - Pressure and RPM operating mode LEDs.
    - Throttle ready LED.
    - Engine RPM; shown with four daylight bright LED digits more than 1/2" high.
    - Check engine and stop engine warning LEDs.
    - Oil pressure; shown on a dual color (green/red) LED bar graph display.
    - Engine coolant temperature; shown on a dual color (green/red) LED bar graph display.
    - Transmission Temperature: shown on a dual color (green/red) LED bar graph display.
    - Battery voltage; shown on a dual color (green/red) LED bar graph display.
    - The dot-matrix message display shall show diagnostic and warning messages as they occur. It shall show monitored apparatus information, stored data, and program options when selected by the operator. All LED intensity shall be automatically adjusted for day and night time operation.

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

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

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

Inputs to the control panel from the pump discharge and intake pressure sensors shall be electrical. The discharge pressure display shall show pressures from 0 to 600 psi. The intake pressure display shall show pressures from -30 in. Hg to 600 psi.

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

# AKRON INTAKE RELIEF VALVE

A 300-psi adjustable Akron Model 591103 intake relief valve system shall be plumbed on the suction side of the pump to comply fully with NFPA-1901 requirements. Excess pressures shall be plumbed to discharge water under the pump enclosure away from the pump operator.

# PUMP CERTIFICATION

The pump shall be third party performance tested to meet the requirements of NFPA-1901. To ensure top quality and integrity, the test company shall be Underwriters Laboratories (UL).

# PUMP PRIMER

The priming pump will be a Trident air primer system. A push in primer handle will open the priming valve and prime the pump.

# MASTER DRAIN VALVE

A rotary type, 12 port master drain valve shall be provided and controlled at the lower portion of the side pump panel. The valve shall be located in pump compartment lower than the main body and connected in such a manner as to allow complete water drainage of the pump body and all required accessories. Water shall be drained below the apparatus body and away from the pump operator.

# INDIVIDUAL BLEEDERS AND DRAINS

All lines shall drain through the master drain valve or shall be equipped with individual drain valves, easily accessible and labeled.

One (1) individual "Innovative Control" lift up drain valve shall be furnished for each 1-1/2" or larger discharge port and each 2-1/2" gated auxiliary suction.

Drain/bleeder valves shall be located at the bottom of the side pump module panels.

All drains and bleeders shall discharge below the running boards.

# SYNFLEX SUCTION, DISCHARGE, PRESSURE AND CONTROL LINES

Small lines within the pump enclosure shall be constructed from Synflex hose. Uses include, but are not limited to such lines as priming control, gauge lines, drain lines, air control valves, pump shift, supplemental cooling, foam flush and air bleeder valves.

# THERMAL RELIEF VALVE

A Hale Model TRV120 Thermal Relief Valve shall be provided on the pump. If water temperature in the pump exceeds 120 degrees Fahrenheit, the thermal relief valve shall automatically open and discharge pump water to the ground, through a 3/8" discharge line, routed below the pump module. The thermal relief valve shall automatically close when the water temperature is lowered.

An indicator light shall be provided on the operator's panel to illuminate when the thermal relief valve is activated.

An audible alarm shall be provided on the operator's panel to alert the operator when the thermal relief valve is activated.

# TOP MOUNT PUMP MODULE

The pump module shall be a self-supported structure mounted independently from the body and chassis cab. The design must allow normal frame deflection without imposing stress on the pump module structure or side running boards. The pump module shall be securely mounted to the chassis frame rails.

The pump module shall incorporate a formed structure on the top front to support the top mount control panel and required mechanical control handles.

# TOP MOUNTED VALVE CONTROLS

The valves shall be controlled by vertically operated swing handles. Each handle shall be equipped with a twist-lock, easy-grip knob. The valve control handles shall be mounted in-line. Each valve control handle shall be connected to its respective valve via a control rod and a bell crank mechanism, if needed. Each control rod shall consist of a 1/2" pipe welded to a threaded stud to form a rigid linkage. Each pressure gauge shall be located directly above its respective discharge control handle, and shall be clearly marked by color coded name plates.

The pump module shall be a welded frame work utilizing structural steel components properly braced to withstand the rigors of chassis frame flex.

# DUNNAGE AREA

A dunnage area shall be provided above the pump enclosure, behind the top mount control panel, for equipment mounting and storage. This area shall be furnished with a removable 3/16" aluminum tread plate floor and shall be enclosed on the sides.

# TRANSVERSE WALKWAY

There shall be a transverse walkway located at the rear of the chassis cab, ahead of the pump module. The walkway shall be constructed of 3/16" aluminum tread plate and shall be clear and unobstructed for through traffic. Folding step(s) shall be provided if necessary to maintain NFPA step heights.  If steps adjacent to walkway (such as commercial chassis cab access steps) provide NFPA compliant step height, folding steps shall not be provided.

A miscellaneous equipment storage compartment shall be provided at either side of the walkway, outboard of the chassis frame rails. A vertically hinged, aluminum tread plate door with positive closure latch shall be provided on the outboard face of each compartment. Compartments shall be ventilated.

The pump house walkway shall be approximately 18" wide.

# FOLD STEPS REAR CAB WALL

A folding step shall be provided on the exterior rear wall of the cab, on the driver and officer side, to provide easy access to the pump house walkway. The steps shall mount approximately 13" from the bottom of the rear cab sheet and centered 6" from the outer edge of the cab. The step shall match the folding steps utilized on the apparatus body.

# \*\*\*\*\* PUMP SUCTIONS & AUXILIARY INLETS \*\*\*\*\*

# SUCTION INLETS

Two (2) 6" N.S.T. suction inlets shall be provided, one on the driver side and one on the officer side pump panel. A removable strainer shall be installed on each inlet.

# INTAKE BUTTERFLY VALVE - ELECTRIC OPERATED - DRIVER SIDE

The fire pump shall be fitted with a Hale Master Intake Valve (MIV), on the driver side main suction inlet. The valve shall be mounted between the suction tube extension and the suction tube, and shall be recessed behind the operator's panel. The valve body and all related components that are in contact with water shall be manufactured of fine grained, corrosion resistant bronze. The valve shall have a bore of 6.40". The valve shall incorporate a pressure relief valve, set at the pump manufacturer’s facility to a rating of 125 PSI. The pressure relief valve shall provide protection for the suction hose even with the valve in the closed position. The valve shall incorporate NFPA-1901 compliant, large diameter hose air bleed valve, controlled at the operator's panel.

The valve shall be operated by a twelve (12) volt DC motor, as standard. It shall also incorporate a knob control manual override, mounted at the suction inlet. The electric control shall incorporate a placard with status lights to indicate whether the valve is in the closed, open or throttled position. The valve shall not be able to move from fully open to fully closed in under three (3) seconds, in compliance with NFPA-1901.

# PUMP SUCTION ENDS

The main pump suction inlets shall be furnished with a short suction end, terminating with only the suction threads protruding through the side panel to minimize the distance an exterior appliance protrudes beyond the pump panel.

The two (2) suction caps provided as standard equipment shall be deleted.

One (1) 6" NSTF x 5" Storz Kochek SKE-R 30°-degree adapter and cap shall be provided for the driver side main suction inlet.

One (1) 6" NSTF x 5" Storz Kochek SKE-R 30°-degree adapter and cap shall be provided for the officer side main suction inlet.

# AUXILIARY SIDE SUCTION(S)

One (1) 2-1/2" auxiliary suction shall be provided at the driver side pump panel, to the rear of the main inlet. The 2-1/2" auxiliary suction shall terminate with a removable strainer, chrome plated 2-1/2" NST female swivel with a chrome plated plug and retaining chain.

An Akron Brass 2 1/2" Generation II Swing-Out™ Valve shall be provided for the driver's side rear auxiliary suction. The valve shall have an all brass body with flow optimizing stainless steel ball and dual polymer seats.

A 1/4 turn swing control handle shall be provided on the driver side rear auxiliary suction valve

All side gated inlet valves shall be recess mounted behind the side pump panels or body panels.

# TANK TO PUMP

One (1) 3" tank to pump line shall be, piped through the front bulkhead of the tank with a 90-degree elbow down into the tank sump. This line shall be plumbed directly into the rear of the pump suction manifold for maximum efficiency.

A check valve shall be provided to prevent accidental pressurization of the water tank through the pump connection. Connection from the valve to the tank shall be made by using a non-collapsible flexible rubber hose.

An Akron Brass 3" Generation II Swing-Out™ Valve shall be provided between the pump suction manifold and the water tank. The valve shall have an all brass body with flow optimizing stainless steel ball and dual polymer seats.

A locking push/pull swing control handle shall be located on the operator's panel with function plate.

# TANK FILL

One (1) 2" gated full flow pump to tank refill line controlled at the pump panel shall be provided. A deflector shield inside the tank shall be furnished. Tank fill plumbing shall utilize 2" high pressure hose for tank connection to accommodate flexing between components.

An Akron Brass 2" Generation II Swing-Out™ Valve shall be provided between the pump discharge manifold and the water tank. The valve shall have an all brass body with flow optimizing stainless steel ball and dual polymer seats.

A locking push/pull swing control handle shall be located on the operator's panel with function plate.

# \*\*\*\*\* DISCHARGES & ACCESSORIES - TOP MOUNT \*\*\*\*\*

# DRIVER'S SIDE MAIN DISCHARGE #1

A discharge shall be provided and located at the driver's side pump panel. The driver's side discharges # 1 shall terminate with NST threads, through the left panel above the main pump intake.

The main pump discharge shall be plumbed directly from the pump discharge manifold utilizing direct connect discharge valve flanges.

An Akron Brass 2 1/2" Generation II Swing-Out™ Valve shall be provided for the driver's side #1 discharge. The valve shall have an all brass body with flow optimizing stainless steel ball and dual polymer seats.

The discharge valve shall be equipped with a straight 2 1/2" NST adapter that shall be equipped with a 2 1/2" NST, 30-degree, chrome plated elbow.

A 2 1/2 " NST chrome plated pressure vented cap shall be installed on driver's side #1 discharge.

The driver's side # 1 discharge valve shall be controlled by a locking push/pull swing handle located on the top mount operator's panel.

The driver's side # 1 discharge shall be equipped with an Innovative Controls, Nite-Glo, 2 ½” diameter glycerin filled pressure gauge with pulse and vibration dampening. The gauge accuracy shall comply with ANSI B40.1 Grade A requirements, temperature range shall be from -40° F to +160° F.

Gauge construction shall be a heavy duty die cast brass case. Clear, scratch resistant molded crystals with captive O-ring seals, shall be used to ensure distortion free viewing and to seal the gauge.

The gauge shall have a white face with black lettering and shall include red LED backlighting with a red high operating pressure range.

# DRIVER'S SIDE MAIN DISCHARGE #2

A discharge shall be provided and located at the driver's side pump panel. The driver's side discharges # 2 shall terminate with NST threads, through the left panel above the main pump intake.

The main pump discharge shall be plumbed directly from the pump discharge manifold utilizing direct connect discharge valve flanges.

An Akron Brass 2 1/2" Generation II Swing-Out™ Valve shall be provided for the driver's side #2 discharge. The valve shall have an all brass body with flow optimizing stainless steel ball and dual polymer seats.

The discharge valve shall be equipped with a straight 2 1/2" NST adapter that shall be equipped with a 2 1/2" NST, 30-degree, chrome plated elbow.

A 2 1/2" NST chrome plated pressure vented cap shall be installed on driver's side # 2 discharge.

The driver's side # 2 discharge valve shall be controlled by a locking push/pull swing handle located on the top mount operator's panel.

The driver's side # 2 discharge shall be equipped with an Innovative Controls, Nite-Glo, 2 ½” diameter glycerin filled pressure gauge with pulse and vibration dampening. The gauge accuracy shall comply with ANSI B40.1 Grade A requirements, temperature range shall be from -40° F to +160° F.

Gauge construction shall be a heavy duty die cast brass case. Clear, scratch resistant molded crystals with captive O-ring seals, shall be used to ensure distortion free viewing and to seal the gauge.

The gauge shall have a white face with black lettering and shall include red LED backlighting with a red high operating pressure range.

# OFFICER'S SIDE MAIN DISCHARGE #1

A discharge shall be provided and located at the officer's side pump panel. The officer's side discharges #1 shall terminate with NST threads, through the officer's side panel above the main pump intake.

The main pump discharge shall be plumbed directly from the pump discharge manifold utilizing direct connect discharge valve flanges.

An Akron Brass 3" Generation II Swing-Out™ Valve shall be provided for the officer's side #1 discharge. The valve shall have an all brass body with flow optimizing stainless steel ball and dual polymer seats.

The discharge valve shall be equipped with a straight 3" NST adapter that shall be equipped with a 3" NST, 30-degree, chrome plated elbow.

A 3" NSTF X 5" Storz Kochek S37S straight adapter with cap shall be provided on the officer's side # 1 discharge.

The officer's side # 1 discharge valve shall be controlled by a locking push/pull swing handle located on the top mount operator's panel.

The officer's side # 1 discharge shall be equipped with an Innovative Controls, Nite-Glo, 2 ½” diameter glycerin filled pressure gauge with pulse and vibration dampening. The gauge accuracy shall comply with ANSI B40.1 Grade A requirements, temperature range shall be from -40° F to +160° F.

Gauge construction shall be a heavy duty die cast brass case. Clear, scratch resistant molded crystals with captive O-ring seals, shall be used to ensure distortion free viewing and to seal the gauge.

The gauge shall have a white face with black lettering and shall include red LED backlighting with a red high operating pressure range.

# OFFICER'S SIDE MAIN DISCHARGE #2

A discharge shall be provided and located at the officer's side pump panel. The officer's side discharges #2 shall terminate with NST threads, through the officer's side panel above the main pump intake.

The main pump discharge shall be plumbed directly from the pump discharge manifold utilizing direct connect discharge valve flanges.

An Akron Brass 2 1/2" Generation II Swing-Out™ Valve shall be provided for the officer's side #2 discharge. The valve shall have an all brass body with flow optimizing stainless steel ball and dual polymer seats.

The discharge valve shall be equipped with a straight 2 1/2" NST adapter that shall be equipped with a 2 1/2" NST, 30-degree, chrome plated elbow.

A 2 1/2" NST chrome plated pressure vented cap shall be installed on officer's side #2 discharge.

The officer's side #2 discharge valve shall be controlled by a locking push/pull swing handle located on the top mount operator's panel.

The officer's side # 2 discharge shall be equipped with an Innovative Controls, Nite-Glo, 2 ½” diameter glycerin filled pressure gauge with pulse and vibration dampening. The gauge accuracy shall comply with ANSI B40.1 Grade A requirements, temperature range shall be from -40° F to +160° F.

Gauge construction shall be a heavy duty die cast brass case. Clear, scratch resistant molded crystals with captive O-ring seals, shall be used to ensure distortion free viewing and to seal the gauge.

The gauge shall have a white face with black lettering and shall include red LED backlighting with a red high operating pressure range.

# TOP MOUNT DISCHARGE CONTROLS

All top mount valves shall be controlled by a locking push/pull swing handle unless otherwise noted in the individual discharge below.

# OFFICER SIDE REAR DISCHARGE

A 2 1/2" NST rear discharge shall be provided at the rear of the vehicle, plumbed from the pump.

The rear discharge shall be plumbed through a pipe sleeve integrated into the water tank that shall terminate on the rear body panel, on the officer side of the body directly below the lower hose bed.

The officer side rear discharge pipe shall be equipped with a chrome 2 1/2" NSTM thread adapter.

The officer side rear discharge shall be plumbed utilizing 2 1/2" schedule 10 stainless steel piping, 45-degree elbows and a limited number of 90-degree sweep elbows in an assembly from the pump to the rear of the vehicle.

A minimum of one (1) grooved pipe coupling shall be furnished in this assembly to allow for flex and serviceability.

An Akron Brass 2 1/2" Generation II Swing-Out™ Valve shall be provided for the officer's side rear discharge. The valve shall have an all brass body with flow optimizing stainless steel ball and dual polymer seats.

The officer side rear discharge valve shall be controlled by a push/pull handle located on the operator's panel.

One (1) 2 1/2" NST chrome plated pressure vented cap shall be installed at the officer side rear discharge.

The officer side rear discharge shall be equipped with an Innovative Controls, Nite-Glo, 2 ½” diameter glycerin filled pressure gauge with pulse and vibration dampening. The gauge accuracy shall comply with ANSI B40.1 Grade A requirements, temperature range shall be from -40° F to +160° F.

Gauge construction shall be a heavy duty die cast brass case. Clear, scratch resistant molded crystals with captive O-ring seals, shall be used to ensure distortion free viewing and to seal the gauge.

The gauge shall have a white face with black lettering and shall include red LED backlighting with a red high operating pressure range.

# DRIVER SIDE HOSE BED DISCHARGE

A 2 1/2" NST rear hose bed discharge shall be plumbed to the upper front body panel, extending into the front of the hose bed.

The rear hose bed discharge shall terminate just above the hosebed floor, in the driver side front of the upper hose bed area above the driver side body compartments.

The driver side hose bed discharge pipe shall be equipped with a chrome 2 1/2" NSTM thread adapter.

The driver side hose bed discharge shall be plumbed utilizing 2 1/2" schedule 10 stainless steel piping, 45-degree elbows and a limited number of 90-degree sweep elbows in an assembly from the pump to the rear of the vehicle.

A minimum of one (1) grooved pipe coupling shall be furnished in this assembly to allow for flex and serviceability.

An Akron Brass 2 1/2" Generation II Swing-Out™ Valve shall be provided for the driver's side hose bed rear discharge. The valve shall have an all brass body with flow optimizing stainless steel ball and dual polymer seats.

The driver side hose bed discharge valve shall be controlled by a push/pull handle located on the operator's panel.

One (1) 2 1/2" NST chrome plated pressure vented cap shall be installed the driver's side hose bed discharge.

The driver's side hose bed discharge shall be equipped with an Innovative Controls, Nite-Glo, 2 ½” diameter glycerin filled pressure gauge with pulse and vibration dampening. The gauge accuracy shall comply with ANSI B40.1 Grade A requirements, temperature range shall be from -40° F to +160° F.

Gauge construction shall be a heavy duty die cast brass case. Clear, scratch resistant molded crystals with captive O-ring seals, shall be used to ensure distortion free viewing and to seal the gauge.

The gauge shall have a white face with black lettering and shall include red LED backlighting with a red high operating pressure range.

# DECK GUN DISCHARGE

A deck gun discharge shall be plumbed from the pump to an area on top of the vehicle. The deck gun piping shall be firmly supported and braced.

The deck gun discharge shall be located in the center of the dunnage area above the pump module, centered on the pump operator's panel. The piping shall be positioned so the deck gun appliance is accessible from the pump operator's position.

A pedestal type, 1/4" steel plate support assembly or "U" clamp shall be provided to stabilize deck gun plumbing below deck gun mount flange.

The deck gun discharge pipe shall terminate with 3" NPT threads.

To improve the operation range of the deck gun, the discharge pipe shall be outfitted with a TFT (18") Extend-A-Gun, part # XG18VL-PL. The Extend-A-Gun shall be wired to the hazard light on the cab dash.

# WARNING LIGHT - IN CAB - "DECK GUN RAISED"

A hazard warning light shall be installed to alert the driver, "Deck Gun Raised".

The deck gun piping shall be designed so the overall height of the deck gun in the mounted/stowed position does not exceed the tallest point on the cab/body.

The deck gun discharge shall be plumbed utilizing 3" schedule 10 stainless steel piping, 45-degree elbows and a limited number of 90-degree sweep elbows in an assembly from the pump to the deck gun location.

A minimum of one (1) grooved pipe coupling shall be furnished in this assembly to allow for flex and serviceability.

An Akron Brass 3" Generation II Swing-Out™ Valve shall be provided for the deck gun discharge. The valve shall have an all brass body with flow optimizing stainless steel ball and dual polymer seats.

The deck gun discharge valve shall be controlled by a push/pull handle located on the operator's panel.

The deck gun discharge shall be equipped with an Innovative Controls, Nite-Glo, 2 ½” diameter glycerin filled pressure gauge with pulse and vibration dampening. The gauge accuracy shall comply with ANSI B40.1 Grade A requirements, temperature range shall be from -40° F to +160° F.

Gauge construction shall be a heavy duty die cast brass case. Clear, scratch resistant molded crystals with captive O-ring seals, shall be used to ensure distortion free viewing and to seal the gauge.

The gauge shall have a white face with black lettering and shall include red LED backlighting with a red high operating pressure range.

# AKRON MANUAL DECK GUN

An Akron model # 3416 "Apollo" deck gun shall be supplied and mounted on the deck gun discharge. The monitor shall be equipped with a portable ground base with a 5" Storz inlet. The monitor shall come equipped with a 3488-discharge pipe(stream shaper), stack tips and an Akron model # 5160 "AKROMATIC" 1250 GPM nozzle. The monitor shall also include the following: Pressure gauge on the monitor, carry handle for portable usage, grease fittings for maintenance, safety chains, hardened steel ground spikes and Pyrolite construction.

# FRONT DISCHARGE

A 1 1/2" front #1 discharge shall be plumbed to the front bumper of the vehicle.

The front #1 discharge shall terminate on the top officer's side of the front bumper extension gravel shield with a chrome 1 1/2" NST chicksan swivel adapter.

The front #1 discharge shall be plumbed utilizing 2" schedule 10 stainless steel piping and/or flexible hose, 45-degree elbows and a limited number of 90-degree sweep elbows in an assembly from the pump to the front of the vehicle.

A minimum of one (1) grooved pipe coupling shall be furnished in this assembly to allow for flex and serviceability. Automatic discharge drains shall be provided at all low points in the plumbing.

An Akron Brass 2" Generation II Swing-Out™ Valve shall be provided for the front #1 discharge. The valve shall have an all brass body with flow optimizing stainless steel ball and dual polymer seats.

The front #1 discharge valve shall be controlled by a push/pull handle located on the operator's panel.

The front #1 discharge cap provided as standard equipment shall be deleted.

The front #1 discharge shall be equipped with an Innovative Controls Nite-Glo, 2 ½” diameter glycerin filled pressure gauge with pulse and vibration dampening. The gauge accuracy shall comply with ANSI B40.1 Grade A requirements, temperature range shall be from -40° F to +160° F.

Gauge construction shall be a heavy duty die cast brass case. Clear, scratch resistant molded crystals with captive O-ring seals, shall be used to ensure distortion free viewing and to seal the gauge.

The gauge shall have a white face with black lettering and shall include red LED backlighting with a red high operating pressure range.

# FRONT DISCHARGE BLOW OUT

One (1) front discharge air blowout utilizing a quarter turn shuttle valve to redirect chassis air to the front discharge line shall be provided at the pump operator's panel for cold weather operations.

# DECON HOSE DISCHARGE

The pump system shall be equipped with a garden hose discharge at the pump operator's panel. This discharge shall consist of a 3/4" quarter turn valve and a 3/4" GHT garden hose fitting on the pump panel. A female GHT cap shall be provided for the discharge. A labeled valve control shall be located on the operator's pump panel.

Discharge to be labeled "DECON".

# HORIZONTAL SPEEDLAY #1

Speedlay #1 shall be a transverse hose bed, which shall be designed as an integral part of the pump module design, located forward of the pump just above the frame rails. Hose deployment shall be accomplished from either side of the apparatus. The speedlay hose bed flooring shall be designed to be removable, constructed from brushed finish, perforated aluminum material.

# SPEEDLAY #1 SLIDE-OUT TRAY

A 3/16" aluminum, three (3) sided, "J" shaped slide out tray shall be provided for speedlay #1 to allow easy loading of the hose off the vehicle. The tray shall be designed to slide out from either side of the vehicle. The sides and floor of the opening shall be lined with Nylatron to assist in the loading of the tray.

The tray shall have a cut out on each side of the tray, so it may be used as a handle to remove the tray. The handle area shall extend passed the side panel on each end of the tray to allow removal of the tray without getting fingers caught in the latch tray mechanism.

A cadmium plated thumb type latches shall be provided for the tray to secure the tray in the speedlay opening.

The outer edge of the speedlay #1 hosebed shall be trimmed with two (2) vertical and (1) horizontal (bottom) stainless steel rollers, on each side of the vehicle to assist in hose removal.

The speedlay #1 discharge will terminate at the Driver Side Pump panel with an external threaded end to attach speedlay hose with a 1 1/2" NSTM adapter. .

Speedlay #1 shall be designed to have a minimum total capacity of 3.5 cubic feet as required by NFPA -1901 to accommodate a minimum of 200 feet of 1-3/4" fire hose. The hose shall be loaded in a double stack configuration.

The speedlay #1 discharge shall be plumbed utilizing 2" schedule 10 stainless steel piping and/or flexible hose, 45-degree elbows and a limited number of 90-degree sweep elbows in an assembly from the pump to speedlay hosebed.

A minimum of one (1) grooved pipe coupling shall be furnished in this assembly to allow for flex and serviceability.

An Akron Brass 2" Generation II Swing-Out™ Valve shall be provided for the speedlay #1 discharge. The valve shall have an all brass body with flow optimizing stainless steel ball and dual polymer seats.

The speedlay #1 discharge valve shall be controlled by a push/pull handle located on the operator's panel.

The speedlay #1 discharge shall be equipped with an Innovative Controls, Nite-Glo, 2 ½” diameter glycerin filled pressure gauge with pulse and vibration dampening. The gauge accuracy shall comply with ANSI B40.1 Grade A requirements, temperature range shall be from -40° F to +160° F.

Gauge construction shall be a heavy duty die cast brass case. Clear, scratch resistant molded crystals with captive O-ring seals, shall be used to ensure distortion free viewing and to seal the gauge.

The gauge shall have a white face with black lettering and shall include red LED backlighting with a red high operating pressure range.

# HORIZONTAL SPEEDLAY #2

Speedlay #2 shall be a transverse hose bed, which shall be designed as an integral part of the pump module design, located forward of the pump just above the lower speedlay. Hose deployment shall be accomplished from either side of the apparatus. The speedlay hose bed flooring shall be designed to be removable, constructed from brushed finish, perforated aluminum material.

# SPEEDLAY #2 SLIDE-OUT TRAY

A 3/16" aluminum, three (3) sided, "J" shaped slide out tray shall be provided for speedlay #2 to allow easy loading of the hose off the vehicle. The tray shall be designed to slide out from either side of the vehicle. The sides and floor of the opening shall be lined with Nylatron to assist in the loading of the tray.

The tray shall have a cut out on each side of the tray, so it may be used as a handle to remove the tray. The handle area shall extend passed the side panel on each end of the tray to allow removal of the tray without getting fingers caught in the latch tray mechanism.

A cadmium plated thumb type latches shall be provided for the tray to secure the tray in the speedlay opening.

The outer edge of the speedlay #2 hosebed shall be trimmed with two (2) vertical and (1) horizontal (bottom) stainless steel rollers, on each side of the vehicle to assist in hose removal.

The speedlay #1 discharge will terminate at the Driver Side Pump panel with an external threaded end to attach speedlay hose with a 1 1/2" NSTM adapter.

Speedlay #2 shall be designed to have a minimum total capacity of 3.5 cubic feet as required by NFPA -1901 to accommodate a minimum of 200 feet of 1-3/4" fire hose. The hose shall be loaded in a double stack configuration.

The speedlay #2 discharge shall be plumbed utilizing 2" schedule 10 stainless steel piping and/or flexible hose, 45-degree elbows and a limited number of 90-degree sweep elbows in an assembly from the pump to speedlay hosebed.

A minimum of one (1) grooved pipe coupling shall be furnished in this assembly to allow for flex and serviceability.

An Akron Brass 2" Generation II Swing-Out™ Valve shall be provided for the speedlay #2 discharge. The valve shall have an all brass body with flow optimizing stainless steel ball and dual polymer seats.

The speedlay #2 discharge valve shall be controlled by a push/pull handle located on the operator's panel.

The speedlay #2 discharge shall be equipped with an Innovative Controls, Nite-Glo, 2 ½” diameter glycerin filled pressure gauge with pulse and vibration dampening. The gauge accuracy shall comply with ANSI B40.1 Grade A requirements, temperature range shall be from -40° F to +160° F.

Gauge construction shall be a heavy duty die cast brass case. Clear, scratch resistant molded crystals with captive O-ring seals, shall be used to ensure distortion free viewing and to seal the gauge.

The gauge shall have a white face with black lettering and shall include red LED backlighting with a red high operating pressure range.

# SPEED LAY HOSEBED HOSE RETENTION

Vinyl coated polyester covers shall be provided on each side of the speed lays to retain hose in the speed lays. The covers shall be secured with expandable loops sewn into the covers and hooks on the apparatus.

The speed lay end flap shall be black in color.

# \*\*\*\*\*\* CONCENTRATE PIPING & FOAM SYSTEM \*\*\*\*\*\*

# FOAM PIPING - 1 INCH BRASS

All foam concentrate plumbing from the tank or auxiliary foam inlet to the foam system components shall be brass and nonferrous material.

The foam system piping shall incorporate a check valve to prevent water from entering the foam tank; the discharge piping shall also include a check valve to prevent foam solution from back feeding into the discharge side of the pump. Individual discharge piping shall be as specified for each discharge.

The complete foam system shall be tested in accordance with NFPA-1901.

# HALE FOAMLOGIX 2.1

The apparatus shall be equipped with an automatic electronically controlled direct injection pump and discharge side foam proportioning system. Foam proportioning operation shall be based on direct measurement of water flow, and remain consistent within the specified flows and pressures.

# SYSTEM REQUIREMENTS

The complete foam proportioning system shall include the following:

* + - Foam Pump
    - Control System
    - Foam Concentrate Strainer
    - Integral Check Valve/ Injector Fitting
    - Flow sensor
    - Control Cables
    - Low Tank Level Switch
    - Water Discharge Check Valves
    - Documentation

A 12-volt DC powered variable-speed 2.1 gpm electronic direct-injection foam-concentrate proportioning system with a 2.1-gpm-foam concentrate pump shall be integrated into the apparatus to provide foam proportioning. The pump shall be capable of handling most Class A foam concentrates only and be operated by a full-function panel mounted digital display.

The system shall operate via a paddlewheel flow sensor mounted in a 3-inch stainless steel double waterway check-valve manifold that includes a ½-inch chemical injection point check valve. This double check-valve assembly is required for back flow prevention and NFPA compliance. A single check valve assembly shall not be permitted.

The inlet of this stainless-steel manifold/double check-valve assembly shall be connected to the fire pump, and the outlet connected to the foam capable discharge outlet(s) on the fire apparatus, as specified. The flow sensor/stainless-steel foam manifold combination shall be capable of water or foam solution flow rates of 30- to 750-gpm.

The foam proportioning system shall be equipped with a panel mounted digital display control unit with a microprocessor that monitors total water flow and foam concentrate pump output to provide the operator preset proportional amount of foam concentrate injected on the discharge side of the fire pump. Total foam concentrate pump concentrate output shall be 2.1 gallons per minute. Proportioning rate is push-button set by the pump operator on the digital display from 0.1% to 1%, in 0.1% increments. The maximum injection pressure shall up to 250 psi.

The digital display panel mounted electronic operator control unit shall provide concentrate injection readout in tenths of a percent while also being able to read water flow, total water flow and total amount of foam concentrate used. The control shall flash a warning indicating low concentrate in the reservoir to the operator, and shall be able to shut off the concentrate pump to prevent damage to the pump. A bar graph on the control unit shall provide visual indication of system operating capacity and shall indicate when capacity is exceeded.

The foam concentrate pump shall be fed concentrate by a non-metallic housing foam concentrate strainer that is equipped with a service shut-off valve.

The unit shall be fed 12-volt DC power from the apparatus electrical system, and be equipped with a chassis frame ground strap, per the foam proportioner manufacturer’s installation and operating instruction manual.

The discharge piping shall be equipped with a properly sized flow meter sensor, based on the systems capabilities.

The foam system shall be plumbed to the following discharge/s through the discharge piping or manifold system:

* Speedlay #1 discharge.
* Speedlay #2 discharge
* Front discharge.

The foam proportioning system shall be supplied from the foam concentrate storage tank/s. The tank/s shall be constructed of materials compatible with foam concentrates being used in the system. Tank capacity, venting, fill opening and foam outlet plumbing connections shall be in accordance with NFPA requirements. Foam tank lid shall be sealed and latched in accordance with NFPA standards. If required a provision shall be made for installation of low tank level sensors and routing of the wiring for the sensors.

# \*\*\*\* PUMP PANEL & ACCESSORIES \*\*\*\*\*

# PUMP PANEL - TOP MOUNT

The pump operator's control panel shall be located above the pump towards the rear of the transverse walkway area with the operator facing the rear of the apparatus to operate the pump controls.

The top and side panels shall be completely removable and designed for easy access and servicing.

# TOP MOUNT GAUGE PANEL

The top operator's panel shall be fabricated from 14-gauge 304L stainless steel with a #4, (150/180 grit), standard polished finish.

# SIDE PUMP PANEL MATERIAL

The left and right-side pump panel shall be fabricated from 14-gauge 304L stainless steel with a #4, (150/180 grit), standard polished finish.

# HINGED GAUGE PANEL

An angled full width, horizontally hinged gauge access panel shall be provided at the top mount operator's position. Chrome plated positive locks shall be provided along with chain holders to secure the panel in the opened position.

# VERTICALLY HINGED, SPLIT PUMP PANEL DRIVER SIDE

The driver side pump panel shall be split, vertically hinged, to provide complete access to the pump and plumbing on the driver side of the pump enclosure. The panels shall be equipped with stainless steel hinges and secured with push type locks to hold the panels closed. The drains located on the driver side panel shall be fastened to the lower panel, which shall be stationary.

# VERTICALLY HINGED, SPLIT PUMP PANEL OFFICER SIDE

The officer's side pump panel shall be split, vertically hinged, to provide complete access to the pump and plumbing on the officer side of the pump enclosure. The panels shall be equipped with stainless steel hinges and secured with push type locks to hold the panels closed. The drains located on the officer's side panel shall be fastened to the lower panel, which shall be stationary.

# PANEL FASTENERS

Stainless steel machine screws and lock washers shall be used to hold these panels in position. The panels shall be easily removable to provide complete access to the pump for major service.

# CAPS AND ADAPTERS SAFETY TETHER

All applicable discharge and suction caps, plugs and adapters shall be equipped with chrome plated ball chain and secured to the vehicle.

# PUMP PANEL TRIM PLATES

A high polished trim plate shall be provided around each discharge port and suction inlet opening to allow accessibility to the respective valve for service and repairs.

# DISCHARGE GAUGE TRIM BEZELS

Each individual discharge gauge shall be installed into a decorative chrome-plated mounting bezel that incorporates valve-identifying verbiage and color labels.

# COLOR CODED IDENTIFICATION TAGS

Color coded identification tags shall be provided for all gauges, controls, connections, switches, inlets and outlets.

# PUMP OPERATOR'S PANEL LIGHT SHIELD

The pump operator’s panel shall be equipped with a light shield that shall be full width of the control panel, and shall be positioned to cover the lights and prevent glare.

The light shield shall be equipped with the following lights:

* Three (3) 20" Amdor Luma Bar H2O super bright led strip lights.

One (1) light under the operator's panel light shield shall be actuated when fire pump is engaged in addition to the pump engaged light.

# TOP MOUNT WALKWAY LIGHTING

The top mount walkway shall be illuminated by the following lights:

* Four (4) TecNiq Eon, 3-LED illumination lights mounted in horizontal stainless-steel bezels and mounting gaskets.

The lights shall be controlled with the marker lights.

# DRIVER SIDE PUMP PANEL

The driver side pump panel shall be equipped with a light shield/step that shall be full width of the control panel, and shall be positioned to cover the lights and prevent glare. The light shield shall be fabricated from aluminum tread plate, which shall also serve as a step. The step shall be a minimum of 8" deep X the width of the pump panel.

The light shield shall be equipped with the following lights:

* One (1) 20" Amdor Luma Bar H2O super bright led strip light.

The lights shall be switched with the top mount panel lights.

# OFFICER SIDE PUMP PANEL

The officer side pump panel shall be equipped with a light shield/step that shall be full width of the control panel, and shall be positioned to cover the lights and prevent glare. The light shield shall be fabricated from aluminum tread plate, which shall also serve as a step. The step shall be a minimum of 8" deep X the width of the pump panel.

The light shield shall be equipped with the following lights:

* One (1) 20" Amdor Luma Bar H2O super bright led strip light.

The lights shall be switched with the top mount panel lights.

# PUMP OPERATOR'S PANEL

Particular attention is to be given to functional arrangement of all controls. The pump operator's panel shall accommodate the following:

* Hinged gauge panel
  + - Water tank fill valve
    - Auxiliary suction valve control
    - All discharge valve controls
    - Auxiliary engine cooler controls
    - Water tank suction control valve
    - Pump primer valve
    - Engine throttle control
    - Master compound vacuum gauge
    - Master pressure gauge
    - Individual discharge gauges
    - Pump shift engaged indicator light
    - Water tank water level indicator
    - Engine tachometer
    - Engine oil pressure gauge with audible alarm
    - Engine water temperature gauge with audible alarm
    - Low voltage light and audible alarm
    - Pump panel light switch
    - Speed counter (Underwriters)
    - Pump performance plate (Underwriters)
    - Pump serial No. plate
    - Master pump drain valve
    - Individual drains
    - Voltmeter
    - Air inlet/outlet at lower driver side panel
* Fire Research #TGA400 "IN CONTROL" pressure governor control.

# PUMP TEST PORTS

The pump panel shall be equipped with Vacuum & Pressure test plugs to allow for test equipment to monitor pump pressure and vacuum levels. Chrome plugs and labels shall be provided for the test ports.

# MASTER GAUGES

One (1) 4" diameter pressure gauge (labeled: "PRESSURE") and one (1) 4" diameter compound vacuum gauge (labeled: "INTAKE") shall be provided. The master gauges shall be Innovative Controls Nite-Glo**,** glycerin filled.

The pressure gauge shall have a white face with black lettering and shall include white LED backlighting with a black high operating pressure range.

The intake gauge shall have a white face with black lettering and shall include white LED backlighting with a burgundy high operating pressure range.

# PRESSURE & COMPOUND GAUGE RANGES

All applicable pressure gauges shall have a range of 0 - 400 P.S.I., and the compound gauge shall have a range of -30" - 0 - 400 P.S.I.

# ENGINE COOLER

An auxiliary cooler or heat exchanger shall be installed in the engine compartment between the engine and the chassis radiator. The cooler shall permit the use of water from the pump for cooling the engine. The cooling shall be done without mixing engine and pump water.

# TANK LEVEL GAUGE

A Fire Research, model #WLA300-A00, "TANKVISION" gauge that shows the actual volume of water in the tank shall be provided on the pump operator's panel. The "TANKVISION" gauge is designed for both ease of operation and installation. The "TANKVISION" gauge utilizes ultra-bright multi-color LEDs for sunlight readability and also uses 2 specially designed wide-viewing lens for 180° of clear viewing. The "TANKVISION" gauge utilizes a pressure sender to measure the liquid volume. The gauge shall be equipped with a self-calibration feature that allows the LEDs TANKVISION gauge to be used on tanks of different shapes and sizes.

**Features:**

* Flashes warning when the volume is less than 25%. Rapid down scrolling LEDs alert the operator when the tank is almost empty. Remote audio warning available.
  + - One size fits all’. The self-calibration feature allows for easy calibration of any shape or size tank.
    - Multiple displays are possible with a single sender through the FRC data bus.
    - Rugged waterproof cast aluminum housing.
    - No fitting needed for poly tank.
    - Special fittings available for other tank materials.
    - Connector disconnects at back of display.

The gauge shall use a pressure transducer installed near the bottom of the water tank to determine the correct volume in the tank.

A Fire Research model #WLA290, remote relay module shall be provided to provide outputs for large indicator lights on the side of the vehicle.

# LARGE LIGHT WATER LEVEL GAUGE, EACH SIDE OF CAB

A large light water level gauge system shall be provided on both sides of the cab. Each side shall have a Whelen model PSTANK, LED strip light, surface mounted, behind the rear crew door above the handrail.

The strip light shall indicate the following water levels:

* + - Green LED cluster Full tank
    - Blue LED cluster 3/4 tank
    - Amber LED cluster 1/2 tank
    - Red LED cluster 1/4 tank

The red LED’s shall burn steady to indicate 1/4 tank and shall start to flash when the water level drops below 1/4 tank. To prevent distraction to drivers, this tank level gauge shall be wired to display only when the park brake is engaged.

# LARGE LIGHT WATER LEVEL GAUGE, REAR OF BODY

A large light water level gauge system shall be provided on the rear of the body. The Whelen model PSTANK, LED strip light shall be surface mounted.

The strip light shall be mounted as to indicate the following water levels:

* + - Green LED cluster Full tank
    - Blue LED cluster 3/4 tank
    - Amber LED cluster 1/2 tank
    - Red LED cluster 1/4 tank

The red LED’s shall burn steady to indicate 1/4 tank and shall start to flash when the water level drops below 1/4 tank. To prevent distraction to drivers, this tank level gauge shall be wired to display only when the park brake is engaged.

# FOAM TANK LEVEL GAUGE - FOAM TANK "A"

A Fire Research, model #WLA360-A00, "TANKVISION" gauge that shows the actual volume of foam in the tank shall be provided on the pump operator's panel. The "TANKVISION" gauge is designed for both ease of operation and installation. The "TANKVISION" gauge utilizes ultra-bright multi-color LEDs for sunlight readability and also uses 2 specially designed wide-viewing lens for 180° of clear viewing. The "TANKVISION" gauge utilizes a pressure sender to measure the liquid volume. The gauge shall be equipped self-calibration feature allows the TANKVISION gauge to be used on tanks of different shapes and sizes.

The gauge shall use a pressure transducer installed near the bottom of the foam tank to determine the correct volume in the tank.

# WATER TANK

The water tank shall have a capacity of 750 gallons, constructed from Poly material.

# FOAM TANK "A"

In addition to the water capacity of the tank, a 20-gallon integral foam storage area shall be built into the water tank. The foam tank shall have a latched fill tower, properly labeled as the foam fill point. A valved drain shall be provided.

# WATER TANK CONSTRUCTION

The Poly water tank shall be constructed of PT3 polypropylene material. This material shall be a non-corrosive stress relieved thermoplastic and UV stabilized for maximum protection. Tank shell thickness may vary depending on the application and may range from 1/2 to 1" as required. Internal baffles are generally 3/8" in thickness.

The tank shall be of a specific configuration and is so designed to be completely independent of the body and compartments. 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. 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 1/8" on all dimensions.

# WATER CAPACITY CERTIFICATION

All tanks shall be tested and certified as to capacity on a calibrated and certified tilting scale. Each tank shall be weighed empty and full to provide precise fluid capacity. Each Poly-Tank's III is delivered with a Certificate of Capacity delineating the weight empty and full and the resultant capacity based on weight.

# WATER 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.

# WATER TANK ISO CERTIFICATION

The tank must be designed and fabricated by a tank manufacturer that is ISO 9001:2000 certified in each of its locations. The ISO certification must be to the current standard in effect at the time of the design and fabrication of the tank.

# WATER TANK LID

The tank cover shall be constructed of 1/2" 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" minimum polypropylene dowels spaced a maximum of 40" 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 dowers shall accommodate the necessary lifting hardware.

# WATER TANK FILL TOWER

The tank shall have a combination vent and manual fill tower. The fill tower shall be constructed of 1/2" PT3 polypropylene and shall be a minimum dimension of 8" x 8" outer perimeter. The fill tower shall be blue in color indicating that it is a water-only fill tower. The tower shall be located in the left front corner of the tank unless otherwise specified by the tank manufacturer to the purchaser. The tower shall have a 1/4" 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 that is designed to run through the tank, and shall be piped to discharge water behind the rear wheels as required in NFPA 1901 so as to not interfere with rear tire traction.

# WATER TANK OVERFLOW AND VENT PIPE

The fill tower shall be fitted with an integral 4" I.D. schedule 40 P.V.C. combination overflow/vent pipe running from the fill tower through the tank to a 4" coupling flush mounted into the bottom of the tank to allow water to overflow behind the chassis rear axle.

# WATER TANK SUMP

The tank sump shall be a minimum of 10" wide x 10" long x 3" deep. An anti-swirl plate shall be mounted inside the sump, approximately 1" above the bottom of the sump.

# WATER TANK 3" SUMP DRAIN

A 3" drain plug shall be provided.

# WATER TANK FLANGES/OUTLETS - PUMPER

There shall be two (2) standard tank outlets; one for tank-to-pump suction line which shall be a minimum of 4" coupling and one for a tank fill line which shall be a minimum of a 2" NPT coupling. All tank fill couplings shall be backed with flow deflectors to break up the stream of water entering the tank.

# WATER TANK MOUNTING ALL "T" TANKS - PUMPER

The tank shall rest on the body cross members spaced a maximum of 22" apart, and shall be insulated from these cross members with a minimum of 3/8" nylon webbing or 1/2" rubber, 2-1/2" wide. The tank shall sit cradle-mounted using four (4) corner angles of 6 x 6 x 4 x 0.250 welded directly to the body cross members. The angles shall keep the tank from shifting left to right or front to rear. The tank is designed on the free-floating suspension principle and shall not require the use of hold downs. The tank shall be completely removable without disturbing or dismantling the apparatus body structure. The body or hose bed cross braces shall act as water tank retainers.

# DIRECT TANK FILL - DRIVER SIDE

One (1) 2-1/2" NST direct tank fill shall be provided at the rear of the body, on the driver side, as low as possible. The direct tank fill shall be gated with a 2-1/2" Akron ball valve with a swing handle. The fill shall be equipped with a 30-degree elbow terminating with a 2-1/2" NST female swivel connection. A quarter turn drain valve shall be supplied to bleed off excess pressure with a drain hose routed beneath the rear step area.

# APPARATUS BODY DESIGN CONSTRUCTION

The body side and compartment assemblies shall be designed and assembled to provide maximum strength and durability under all operating conditions.

Special attention shall be taken to minimize corrosion on all fabricated parts and structural members of the body. All bolt-on components shall be provided with a dissimilar metals isolation barrier to prevent electric corrosion. The body design shall also incorporate removable panels to access spring hangers, rear body mounts and fuel tank sending units.

The body assembly shall be an all-welded configuration. The body shall be completely isolated from the cab and pump module structure.

Dimensions used in this specification shall be the general outer dimension taken from a typical line diagram of the apparatus. These dimensions shall not take into account items like material thickness, access panels, doors, and other installed options.

# COMPARTMENT DRIP MOLDING

Compartment tops over all side compartments shall have a flange formed to provide protection against water runoff. For bodies with wide hose beds or coffin compartments a secondary extruded drop molding shall be provided above the compartments.

# REAR BODY PANEL

The rear body panel shall extend the full width between the body side compartments. This panel shall be full height from the rear step to the hose bed floor. No part of the rear panel shall be attached to the booster tank.

The rear body panel material shall be aluminum tread plate as standard. If Chevron striping is specified for the rear of the body, then smooth aluminum shall be utilized.

# BODY AND COMPARTMENT FABRICATION - 3/16" ALUMINUM

All compartment panels and body side sheets shall be fabricated entirely of 3/16" aluminum (5052-H32). Each side compartment assembly shall be both plug welded and stitch welded to ensure proper weld penetration on all panels while avoiding the possible warping caused by a full seam weld. The side compartments shall be welded on a fixture to ensure true body dimensions of all door openings. The side compartments and body side panels are then set into a body squaring fixture where the super structure is installed and the entire body is aligned to be completely symmetrical. The super structure is then welded to the compartment side panels and reinforcement plates are inserted which allows the compartment panels to become an integral component of the body support structure. A full seam weld shall not be used due to the applied heat which shall distort sheet metal and remove the protective coating from the perimeter of the welded area. All seams shall be caulked prior to finish paint to ensure proper compartment seal.

Any deviation or exceptions of material, dimensions or performance must be clearly identified as an exception and explained on the exceptions page.

Due to safety concerns and requirements by the Fire Department, there shall be no exceptions to the thickness of material used on the Apparatus body. Failure to provide a bid with 3/16” panels and body sheets will be rejected as non-compliant.

# SUB STRUCTURE - ALUMINUM

The body sub structure shall be an all welded configuration utilizing a combination of 3” x 1-1/2” 6061-T6 thick walled structural tubing and 6061 structural channel.

This structure shall be designed to totally support the full length and width of the body and shall be welded to the body side compartments by use of reinforcement plates to incorporate the compartments into an integral part of the body weldment.

The sub structure shall be bolted to the sides of the chassis frame at four (4) points. The two (2) forward mounting points shall utilize a spring mount to help isolate the body from chassis deflection.

This design shall provide storage capacity in each side compartment for a minimum of 500 lbs. of equipment, and a minimum of 1000 lbs. of equipment in the rear step compartment.

Any deviation or exceptions of material, dimensions or performance must be clearly identified as an exception and explained on the exceptions page.

Due to safety concerns and requirements by the Fire Department, there shall be no exceptions to the thickness and type of material used on the Apparatus body. Failure to provide a bid without these requirements will be rejected as non-compliant.

# FIRE BODY WIDTH

The fire body shall be 100" wide to provide the maximum amount of usable hose bed and compartment space. The side body compartments shall be 29" deep in any full depth areas, and 14" deep in any split depth areas.

Any deviation or exceptions of material, dimensions or performance must be clearly identified as an exception and explained on the exceptions page.

# BODY FENDER

The body fender shall be 64" long, this shall allow for the suspension and related components to be contained within the fender, preventing any intrusion into the body compartment storage area. Bodies with notches in the front and/or rear compartment for suspension components are not acceptable.

Any deviation or exceptions of material, dimensions or performance must be clearly identified as an exception and explained on the exceptions page.

# DRIVER SIDE - FRONT SECTION OF FENDER

A storage compartment shall be inserted into the fender to provide an open storage area for customer supplied devices such as salvage tarps, rope bags, wheel chocks, etc. The storage area shall be sized as tall and wide as possible in the fender (minimum of 14" wide x 15" tall with an angled floor by fender radius), and shall be 26" deep.

This storage compartment shall provide a minimum of 2.3 cubic feet of storage space.

Any deviation or exceptions of material, dimensions or performance must be clearly identified as an exception and explained on the exceptions page.

# DRIVER SIDE - REAR SECTION OF FENDER

A storage compartment shall be inserted into the fender to provide a storage area for two (2) customer supplied SCBA cylinders (or fire extinguishers of similar size). The storage area shall be sized as tall and wide as possible in the fender (minimum of 15" wide x 7-3/4" tall), and shall be 26" deep. The compartment shall have a non-abrasive lined cradle storage area for each of the devices.

This storage compartment shall provide a minimum of 1.6 cubic feet of storage space.

Any deviation or exceptions of material, dimensions or performance must be clearly identified as an exception and explained on the exceptions page.

# OFFICER SIDE - FRONT SECTION OF FENDER

A storage compartment shall be inserted into the fender to provide a storage area for three (3) customer supplied SCBA cylinders (or fire extinguishers of similar size). The storage area shall be sized as tall and wide as possible in the fender (minimum of 14" wide x 15" tall with an angled floor by fender radius), and shall be 26" deep. The compartment shall have a non-abrasive lined cradle storage area for each of the three (3) devices.

This storage compartment shall provide a minimum of 2.3 cubic feet of storage space.

Any deviation or exceptions of material, dimensions or performance must be clearly identified as an exception and explained on the exceptions page.

# OFFICER SIDE - REAR SECTION OF FENDER

A storage compartment shall be inserted into the fender to provide a storage area for three (3) customer supplied SCBA cylinders (or fire extinguishers of similar size). The storage area shall be sized as tall and wide as possible in the fender (minimum of 14" wide x 15" tall with an angled floor by fender radius), and shall be 26" deep. The compartment shall have a non-abrasive lined cradle storage area for each of the three (3) devices.

This storage compartment shall provide a minimum of 2.3 cubic feet of storage space.

Any deviation or exceptions of material, dimensions or performance must be clearly identified as an exception and explained on the exceptions page.

# FENDER STORAGE DOORS

The fender storage area(s) shall be enclosed by a hinged door fabricated from the same material as the primary body construction, and painted the primary body color. The back side of the door shall have a section of Nylatron installed to protect the door surface from the items stored in the compartment. Each door shall be tied into the compartment door ajar/do not move apparatus warning system.

# DRIVER SIDE BODY COMPARTMENTATION

One full height/split depth compartment shall be provided forward of the rear wheels. The compartment dimensions shall be 35" wide x 68" tall x 29" deep in the lower 58" tall area, and 14" deep in the upper 10" tall area.

One high side compartment shall be provided above the rear wheels. The compartment dimensions shall be 64" wide x 37" high x 29" deep in the lower 27" tall area and 14" deep in the upper 10" tall area.

One full height/split depth compartment shall be provided behind the rear wheels. The compartment dimensions shall be 56" wide x 68" tall x 29" deep in the lower 58" tall area, and 14" deep in the upper 10" tall area.

Due to operational concerns and requirements by the Fire Department, there shall be no exceptions to these dimensions or material used on the Apparatus body. Failure to provide a bid with these requirements will be rejected as non-compliant.

# OFFICER SIDE BODY COMPARTMENTATION

One full height/split depth compartment shall be provided forward of the rear wheels. The compartment dimensions shall be 35" wide x 68" tall x 29" deep in the lower 58" tall area, and 14" deep in the upper 10" tall area.

One high side compartment shall be provided above the rear wheels. The compartment dimensions shall be 64" wide x 37" high x 29" deep in the lower 27" tall area and 14" deep in the upper 10" tall area.

One full height/split depth compartment shall be provided behind the rear wheels. The compartment dimensions shall be 56" wide x 68" tall x 29" deep in the lower 58" tall area, and 14" deep in the upper 10" tall area.

Due to operational concerns and requirements by the Fire Department, there shall be no exceptions to these dimensions or material used on the Apparatus body. Failure to provide a bid with these requirements will be rejected as non-compliant.

# REAR STEP COMPARTMENT

An equipment storage compartment shall be provided on the rear of the body at the rear step area. The rear step compartment shall be 42" Wide x 26-1/2" High x 29" Deep.

The rear step compartment shall have full side panels which shall isolate this storage area from the side body compartments.

The rear step compartment shall be equipped with a hinged style compartment door. The door shall be a double door configuration. The standard finish shall be aluminum tread plate to match the balance of the rear body panel. On apparatus where this area is specified to be overlaid with Chevron striping, the material shall be flat aluminum overlaid with Chevron striping.

Due to operational concerns and requirements by the Fire Department, there shall be no exceptions to these dimensions or material used on the Apparatus body. Failure to provide a bid with these requirements will be rejected as non-compliant.

# EXTENDED REAR STEP - SQUARE CORNERS

The extended rear step shall be 12" deep, extended beyond the body compartments. The step shall be 100" wide, with square corners. The step shall be fabricated from 3/16" polished aluminum tread plate, and shall be rigidly reinforced.

The rear edge of the step shall be designed to accommodate the rear clearance lights, recessed for protection in the step reinforcement channel. The step shall be bolted into place with a minimum 1/2" clearance gap between the step and rear body panel.

# HOSE BED

The hose bed shall be located directly above the booster tank and shall be free from all sharp objects such as bolts, nuts, etc., to avoid damage to fire hose.

The hose bed shall be a split style bed with a rear lowered section and a forward raised section. This style hose bed shall require an L-shaped water tank and shall provide a hosebed that is no more than 62" from the ground to the bottom of the bed. The hose bed width shall be approximately 57" wide x 69" long.

For added strength, the hose bed side walls shall be approximately 2" thick, this shall provide a mounting surface for devices like warning lights and scene lights. The inner hosebed side walls shall be brushed aluminum panels, which shall prevent damage to painted surfaces when deploying hose. The front wall shall be flanged inward 2" with a 1" downward return to provide additional rigidity to the front wall.

Due to operational concerns and requirements by the Fire Department, there shall be no exceptions to these dimensions or material used on the Apparatus body. Failure to provide a bid with these requirements will be rejected as non-compliant.

# HOSE BED CROSS RAIL

The upper rear hose bed shall have a structural cross rail between the body side panels.   This cross rail shall provide mounting surface for grab rail, fabricated light stanchions, rear cameras, and/or rear traffic control lights, if specified elsewhere in specifications.

# HOSE BED CAPACITY

The hose bed shall be designed with enough storage capacity to carry the following customer specified hose load:

* + - 1,000 Feet of 5" supply hose - lower center section
      * 300 Feet of 2-1/2" preconnected - driver side upper area
      * 500 Feet of 2-1/2" supply - lower section officer side

# HOSE BED FLOORING

Flooring to be constructed from extruded aluminum and be properly spaced for ventilation. The flooring shall be smooth and free from sharp edges to avoid hose damage. The hose bed floor shall be removable to provide access to inner body framework.

# HOSE BED PARTITION

Two (2) aluminum hose bed partitions shall be provided, one (1) fixed and one (1) adjustable. The adjustable partition shall be easily adjustable by means of channels located at the front and rear of the hose bed. The fixed partition shall be bolted at the driver side transition from the upper hose bed area to the lowered hose bed area. All partitions shall be removable for access to the booster tank.

# HOSE PARTITION CUTOUTS

The hose bed partition(s) shall have a vertical handhold cutout atupper rear edge of the partition.

# VINYL HOSE BED COVER - 1/4 TURN FASTENERS

A hose bed cover shall be provided and installed. The cover shall be made from 22 ounce; heavy-duty vinyl coated polyester fabric (TXN 226). The cover shall be sewn with ultraviolet resistant thread and shall have 2" wide nylon webbing sewn around the perimeter to provide additional strength.

The cover shall be secured to the top front body flange with quarter-turn fasteners. The cover shall be secured to the side body flanges with quarter-turn fasteners. A weighted flap shall be furnished on the rear of the cover with two (2) bungee cords.

The Hypalon material shall be black in color.

# COMPARTMENT DOORS

The compartment doors shall be flush type with the outer skin fabricated from 3/16" (5052 H32) aluminum. The door skin shall have a formed flange on one (1) side used as a hinge mounting flange. The door skin shall have reinforcing channels welded internally which accommodate the inner door pan mounting.

The 2" thick compartment doors shall reduce the overall specified compartment depth by 2".

All horizontally hinged doors shall be 1" thick to provide additional compartment storage area. The 1" thick horizontally hinged doors shall reduce the overall specified compartment depth by 1-1/4".

Each inner pan shall be constructed from 1/8" aluminum material, which shall be provided with a brushed finish. The brushed finish shall allow the fire department to remove scratches from the inner door pan with sand paper or scuff pad. Each inner door pan shall be fastened to the door frame channels to provide a smooth, snag-free inner door surface. The inner door pan on the running board compartments shall enclose the latch and reinforcements completely. The pan shall be easily removable to access the enclosed latch mechanism.

Due to operational concerns and requirements by the Fire Department, there shall be no exceptions to these dimensions or material used on the Apparatus body. Failure to provide a bid with these requirements will be rejected as non-compliant.

# COMPARTMENT DOOR HINGES

Hinges shall be full length polished stainless-steel piano type. The hinges shall be mounted with stainless steel hardware.

# COMPARTMENT DOOR SEALS

Enclosed body compartment doors shall be equipped with a closed cell gasket. The gasket material shall be EPDM to provide a gasket resistant to weather, temperature extremes, and aging.

# COMPARTMENT DOOR LATCHES – ROTARY WITH D-RINGS

Externally latched body doors shall be equipped with stainless steel D-ring handles.

Rotary door latches shall be provided for all full height body doors, which shall incorporate rotary latches at the top and bottom of all externally latched single or double doors. Linkages shall be provided between the actuation handle and the latch mechanisms.

The blank door of a double door configuration shall have rotary latches at the top and bottom of each door with the latch release lever accessible thru the door frame, which eliminates the need to reach inside the compartment to release the door. Linkages shall be provided between the actuation handle and the latch mechanisms.

Horizontally hinged doors shall be equipped with a single rotary door latch.

# COMPARTMENT DOOR STAY ARMS

Eberhard gas shock type door hold open devices shall be provided for each vertically and horizontally hinged door.

# SWEEP-OUT COMPARTMENT FLOORS

Compartment floors shall be welded to the compartment walls and have a sweep out design for easy cleaning.

Compartments with hinged doors shall have the door opening flanges bend down to produce the sweep-out design.

Compartments with roll-up style doors shall have the external floor flange stepped down, 1/2" high x 2" deep, to produce a sealing surface for the roll-up doors below the compartment floor. The sweep out design shall also permit easy cleaning.

Due to operational concerns and requirements by the Fire Department, there shall be no exceptions to these dimensions or material used on the Apparatus body. Failure to provide a bid with these requirements will be rejected as non-compliant.

# COATED FASTENERS

All exterior fasteners shall be coated stainless steel screws. Screw threads shall be coated with reusable, self-locking, sealing material to provide vibration resistance. Screw heads shall be coated with a sealing element to prevent galvanic corrosion between dissimilar metals. Non-coated screws shall only be provided as part of vendor supplied component installations.

Due to safety concerns and requirements by the Fire Department, there shall be no exceptions to these dimensions or material used on the Apparatus body. Failure to provide a bid with these requirements will be rejected as non-compliant.

Due to maintenance concerns and requirements by the Fire Department, there shall be no exceptions to these dimensions or material used on the Apparatus body. Failure to provide a bid with these requirements will be rejected as non-compliant

# COMPARTMENT LOUVERS

Ventilation between compartments to atmosphere shall be provided and located to avoid water entry into compartments.

# ACCESS PANELS

Removable access panels shall be provided (if applicable) to access fuel tank sender, electrical junction compartment and rear body mounts.

Protective panels shall be located in the rear compartments providing access to the lights and associated wiring. The covers shall also serve as protective covers to prevent inadvertent damage to lights or wiring from tools or equipment located in the compartment.

Due to operational concerns and requirements by the Fire Department, there shall be no exceptions to these dimensions or material used on the Apparatus body. Failure to provide a bid with these requirements will be rejected as non-compliant

# BODY PROTECTION PANELS

The front face of the side compartments, next to the driver and officer side pump panels shall be overlaid with aluminum tread plate full height protection. The protection panel shall cover the entire front face of the compartment and shall wrap around the corner to the door opening.

# BODY RUB RAILS

Sacrificial aluminum tread plate rub rails shall be mounted at the base of the body, extend outward a minimum 3/4", downward 2" and flange inward 1". The rub rails shall extend the full length of the main body and extend to the rear step or wrap around the rear body corners. Rub rails shall be designed to bolt to the body from the bottom side of the compartment area, so as not to damage the body side panels on initial impact and to provide for ease of replacement.

# RUNNING BOARD STEPS

The driver and officer running board steps shall be fabricated of 3/16" polished aluminum tread plate. The outside edge on each step shall be fabricated with a double break, return flange. The steps shall be rigidly reinforced with a heavy-duty support structure. The running boards shall not form any part of the compartment design, and shall be bolted into place with a minimum 1/2" clearance gap between any panel to facilitate water runoff.

# OFFICER SIDE RUNNING BOARD STORAGE WELL - FLOATING

A floating storage well, constructed of 1/8" aluminum, shall be recessed into the officer’s side running board. The storage well shall measure 9" deep x 9" wide x as long as possible between the running board support members. Drain holes shall be located in the bottom corners to allow water to drain from the storage well. The front and rear bottom corners of the well shall have an angled face to help the well slide up if it strikes an object. The entire well shall be a "floating" style that can easily shift up if an object is struck.

The officer's side running board hose well shall be furnished with Velcro straps to secure the hose stored in the well. The straps shall be attached to each side of the hose well with stainless steel footman loops.

# OFFICER'S SIDE WELL - HOSE CAPACITY

The officer's side storage well shall have the desired capacity of:

* 25' of 5" LDH hose

# DRIVER SIDE RUNNING BOARD STORAGE WELL - FLOATING

A floating storage well, constructed of 1/8" aluminum, shall be recessed into the driver’s side running board. The storage well shall measure 9" deep x 9" wide x as long as possible between the running board support members. Drain holes shall be located in the bottom corners to allow water to drain from the storage well. The front and rear bottom corners of the well shall have an angled face to help the well slide up if it strikes an object. The entire well shall be a "floating" style that can easily shift up if an object is struck.

The driver's side running board hose well shall be furnished with Velcro straps to secure the hose stored in the well. The straps shall be attached to each side of the hose well with stainless steel footman loops.

# DRIVER'S SIDE WELL - HOSE CAPACITY

The driver's side storage well shall have the desired capacity of:

* 25' of 5" LDH hose

# GRAB RAILS

All hand rails shall be 1-1/4" outer diameter, knurled bright anodized aluminum extrusion, designed to meet NFPA 1901 requirements.

Molded gaskets shall be installed between the handrail stanchion castings and body surfaces to prevent electrolytic reaction between dissimilar metals and to protect paint.

# GRAB RAIL LOCATIONS:

Grab rails shall be provided at the following specified locations. Additional grab rails shall be provided adjacent to any additional steps specified to comply with NFPA 1901.

Two (2) vertical rails shall be mounted on the rear edge of the body, one (1) each side.

One (1) horizontal, full width handrail shall be installed on the rear, below the level of the hose bed.

Two (2) vertical handrails shall be mounted above each pump panel, (1) each side.

# FOLDING STEP(S) - BODY FRONT DRIVER SIDE

Innovative Controls large lighted folding step(s), with a textured chrome plate finish, shall be provided on driver side body front to provide NFPA compliant access (maximum 18” height between steps) to an upper horizontal walking surface (compartment cap, dunnage area, fabricated step, or upper body compartments).

# FOLDING STEP(S) - BODY FRONT OFFICER SIDE

Innovative Controls large lighted folding step(s), with a textured chrome plate finish, shall be provided on officer side body front to provide NFPA compliant access (maximum 18” height between steps) to an upper horizontal walking surface (compartment cap, dunnage area, fabricated step, or upper body compartments).

# FOLDING STEP(S)- BODY REAR DRIVER SIDE

Innovative Controls large lighted folding step(s), with a textured chrome plate finish, shall be provided on driver side body rear to provide NFPA compliant access (maximum 18” height between steps) to an upper horizontal walking surface (compartment cap, dunnage area, fabricated step, or upper body compartments).

# FOLDING STEP(S)- BODY REAR OFFICER SIDE

Innovative Controls large lighted folding step(s), with a textured chrome plate finish, shall be provided on officer side body rear to provide NFPA compliant access (maximum 18” height between steps) to an upper horizontal walking surface (compartment cap, dunnage area, fabricated step, or upper body compartments).

# SAFETY SIGN(S) AT REAR STEP AND CROSS WALKWAY(S)

Safety sign(s) shall be located on the vehicle at the rear step, and at any cross walkway(s), to warn personnel that riding in or on these areas while the vehicle is in motion is prohibited.

# REAR WHEEL WELL LINERS

Fully removable, bolt-in, 1/8" aluminum fender liners shall be provided. The wheel well liners shall extend from the outer wheel well body panel, into the truck frame. Removable vertical splash shields, inward of the wheels, shall be provided to give access to the hydraulic components. The completely washable fender liners shall be designed to protect the front and rear compartments and main body supports from road salts, dirt accumulation and corrosion.

# REAR FENDERETTES

The single rear fenders shall be trimmed with replaceable, bolt-in, molded black rubber fenderettes. The fenderettes shall be secured to the body with stainless steel threaded fasteners along the internal perimeter of the wheel well. Rubber welting shall be installed between the fenderettes and the body fender.

# REAR MUD FLAPS

Heavy duty mud flaps shall be provided behind the rear wheels.

# REAR TOW EYES

Two (2) painted tow eyes shall be furnished on the rear of the vehicle. The tow eyes shall be made from plate steel and shall be bolted directly to the chassis frame rails with grade 8 bolts and shall extend below the body. The tow eyes shall be smooth and free from sharp edges, and have a minimum eyelet hole of 2-1/2". The tow eyes shall be painted.

# \*\*\*\* COMPARTMENT ACCESSORIES \*\*\*\*

# RESPOND READY CABINET

A heavy duty Respond Ready drawer system shall be provided and located in compartment R1 on the compartment floor. The drawer system overall dimensions shall be 28" wide x 26" deep. The drawer system shall consist of a standard top shelf, heavy duty 500 lb. slides, lock out drawers, single handle latching hardware, Respond Ready Red powder coated front panels and galvanized components. Each drawer includes four (4) dividers unless otherwise stated. A total of five (5) drawers shall be provided in the following configuration:

* Top 2 drawers = 5" tall
* Middle 2 drawers = 7" tall
* Bottom drawer = 10" tall

# ADJUSTABLE SHELVING

Compartment shelving shall be constructed of 3/16” brush finish aluminum with a 2” upward bend at front and rear, and side supports. Shelving shall be vertically adjustable with spring nuts in aluminum strut channel.

Adjustable shelves shall be located as follows:

Two (2) in the driver side front compartment

Two (2) in the officer side front compartment

One (1) in the driver side rear compartment

One (1) in the officer side rear compartment

# 500 POUND FLOOR MOUNTED ROLL OUT TRAYS

Floor mounted roll-out trays shall consist of heavy duty, roller bearing slide tracks with a load rating of 500 pounds, securely fastened to the compartment floor. The tray shall be fabricated from 3/16" brushed aluminum with a minimum 2" high flange on each of the four sides to assist in retaining the equipment stored on each tray. The slide tracks shall have a 100% extension, allowing the tray to extend out of the compartment completely.

The 500-pound floor mounted roll out trays shall be located as follows:

One (1) in the driver side rear compartment

One (1) in the officer side rear compartment

One (1) in the rear step compartment

# SWING OUT TOOL BOARDS

The tool boards shall be constructed of PAC TRAC Dual Faced 7040 series aluminum extrusion allowing mounting of equipment on the interior and exterior of the tool boards. The tool boards shall be installed with a Performance Advantage Company PM-1000 Swing-Out Module Kit. Aluminum angles shall attach the hinge to Unistrut tracking to allow depth adjustments. A heavy-duty thumb latch shall be provided to secure the tool boards in the closed position.

Swing out tool boards shall be located as follows:

One (1) in the driver side over the wheel high side compartment

One (1) in the officer side over the wheel high side compartment

# BACKBOARD STORAGE

A storage module shall be provided for one (1) backboard(s). The module shall be constructed from 1/8" aluminum and shall be located within the suction hose storage.

Due to operational concerns and requirements by the Fire Department, there shall be no exceptions to this location, dimensions or material used on the Apparatus body. Failure to provide a bid with these requirements will be rejected as non-compliant.

# TURTLE TILE

Turtle Tile brand floor material shall be installed on all compartment floors. The Turtle Tile shall be custom installed to provide full floor coverage.

Floor matting material shall be provided on nine (9) specified shelf(s) or roll-out tray(s).

The compartment flooring color shall be black.

# PAC TRAC

Aluminum Pac Trac #7000 channel material for tool and equipment mounting shall be provided in four (4) high side compartment(s) located in the upper areas. The area shall be approximately 29" down from the split depth area and shall be full width of the compartments. All installation hardware shall be stainless steel.

Locate in the upper areas of compartments L1, L3, R1 and R3.

# LADDER STORAGE RACK - ZIAMATIC SINGLE ARM (OFFICER SIDE)

A hydraulically actuated, single arm, swing down ladder rack, for use with ladders that have a combined weight of approximately 500lbs., shall be provided. The ladders shall be stored horizontally, directly above the officer side compartments. The ladders shall be lowered and raised by means of a hydraulic actuator.

The ladders shall be stored on an 86" long cradle to retain the ladders with two (2) ladder retaining brackets mounted to hold the ladders with the rack down. The cradle shall be equipped with a forward and rear bumper stop, which shall be designed to contact the upper portion of the body to stabilize the ladder rack in the travel position.

The arm mechanism shall be constructed from 2" X 3" rectangular steel tubing arms with a square tubing framework to support the ladder storage angles. The pivot points of the arms shall be mounted with pins through a rigid aluminum casting to maintain structural integrity.

The actuator switch and power on/off switch for the ladder rack shall be located on the officer side pump panel area in an enclosed housing, to provide the operator full view of the rack during the raising or lowering operation. A warning alarm shall activate when the rack is in motion and shall be installed on the officer side rear body panel.

An interlock system shall be provided whereas if any hinged compartment door on the officer side of the body is open, the rack shall not operate.

A flashing warning light labeled: "Do Not Move Apparatus When Light Is On", shall be provided on the cab dash to indicate when the rack is not in the raised travel position.

The forward and rear ends of the ladder rack shall be equipped with flashing lights to warn when the rack is down. The lights shall be amber on the front and red on the rear and shall automatically activate when the rack is not locked in the travel position.

An automatic lock shall be provided for the ladder rack in the nested position that shall automatically engage when the ladder rack is nested.

# OVERHEAD LADDER RACK LOCATION

The specified single arm ladder rack shall be located in the rearward mounting position on the body side. This mounting shall reduce the specified high side compartment width by 17" to accommodate the rack. The 17" void shall be taken from the rear section of the high side compartment.

# LADDER RACK HYDRAULIC COVER

A painted cover shall be installed to cover the hydraulic cylinder actuator arm. The cover shall be painted job color of the body and shall be actuated automatically with operation of the ladder rack.

# LADDERS

The following Duo-Safety ground ladder compliment shall be provided:

* One (1) Duo-Safety series 1225-A, 35', aluminum, three (3) section extension ladder

shall be provided.

* + One (1) Duo-Safety series 900-A, 24', aluminum, two (2) section extension ladder shall be provided.
  + One (1) Duo-Safety series 775-A, 14', aluminum, straight roof ladder with folding hooks shall be provided.
  + One (1) Duo-Safety series 585-A, 10', folding, aluminum, attic ladder shall be provided.

# \*\*\*\* PIKE POLES AND HOLDERS \*\*\*\*

# PIKE POLE STORAGE

Two (2) pike pole tube(s) shall be provided. Each holder shall be accessible from the rear of the apparatus. Each pike pole holder shall be labeled to indicate the pike pole length.

The pike pole tube(s) shall be mounted on the ladder rack.

* One (1) 6' Fire Hooks Unlimited fiberglass handled pike pole(s) shall be provided.
* One (1) 10' Fire Hooks Unlimited fiberglass handled pike pole(s) shall be provided.

# SUCTION HOSE STORAGE

The suction hose shall be located in an area on the officer side just above the split depth area of the officer side body compartments. An overlapping aluminum tread plate vertically hinged door shall be provided on the rear for access. The storage compartment shall be designed for storage of two 6” x 10’ suction hoses.

Note: The suction hose storage shall be designed for one (1) back board storage defined in this specification.

Due to operational concerns and requirements by the Fire Department, there shall be no exceptions to this location, dimensions or material used on the Apparatus body. Failure to provide a bid with these requirements will be rejected as non-compliant.

# SUCTION HOSE

One (1) 8' and One (1) 10' section of six (6) inch Kochek (PVC) suction hose with lightweight hard coat couplings shall be furnished. Couplings shall include a long handle, female swivel on one end and a rocker lug male on the other end. All threads shall be six (6) inch N.S.T.

The barrel strainer, defined later in this specification, shall be installed on the 8' section of hard suction. Storage for the 8' section shall include accommodations for the hose and strainer preconnected.

# STRAINER

One (1) 6" NST, Red Head 140-60001-barrel type strainer(s) shall be provided to attach to the suction hose. A compartment mounting bracket shall also be provided to store the strainer(s) when not in use.

# EQUIPMENT CLARIFICATION

The NFPA-1901 recommended double female hydrant adapter shall not be provided by the apparatus manufacturer.

# ADDITIONAL ITEMS SUPPLIED WITH THE VEHICLE

* 1 - Pint of touch up paint for each color
* 1 -Bag of assorted stainless-steel nuts and bolts

# LOOSE EQUIPMENT

The following items shall be provided and shipped loose with the completed apparatus at the time of delivery:

* One (1) Six-foot NY roof hook
* One (1) Ten-foot NY roof hook

Will be installed on the Ladder rack or hard Suction storage hose area

# WHEEL CHOCKS

Two (2) ZICO #SAC-44 folding wheel chocks shall be mounted forward of the rear wheels on the driver side below the side running board compartments.

# \*\*\*\* PAINT SECTION \*\*\*\*

# PAINT, PREPARATION AND FINISH

The apparatus body shall be painted Sikkens [#COL]. The paint process shall meet or exceed current state regulations concerning paint operations. Pollution control shall include measures to protect the atmosphere, water, and soil. Contractor shall, upon demand, provide evidence that the manufacturing facility is in compliance with State EPA rules and regulations.

The exterior shall have no mounted components prior to painting to assure full coverage of metal treatments and paint to the exterior surfaces of the body.  Any vertically or horizontally hinged smooth-plate compartment doors shall be painted separately to assure proper paint coverage on body, door jambs and door edges.

Paint process shall feature Sikkens high solid LV products and be performed in the following steps:

* Corrosion Prevention - all aluminum surfaces shall be pre-treated with the Alodine

5700 conversion coating to provide superior corrosion resistance and excellent

adhesion of the base coat.

* Sikkens Sealer/Primer LV - acrylic urethane sealer/primer shall be applied to guarantee excellent gloss hold-out, chip resistance and a uniform base color.
* Sikkens High Solid LVBT650 (Base coat) - a lead-free, chromate-free high solid acrylic urethane base coat shall be applied, providing excellent coverage and durability. A minimum of two (2) coats shall be applied.
* Sikkens High Solid LVBT650 (Clear coat) - high solid LV clear coat shall be applied as the final step in order to ensure full gloss and color retention and durability. A minimum of two (2) coats shall be applied.

Any location where the material is penetrated after painting, for the purpose of mounting steps, hand rails, doors, lights, or other specified components shall be treated at the point of penetration with a corrosion inhibiting pre-treatment (ECK Corrosion Control).

The pre-treatment shall be applied to the aluminum sheet metal or aluminum extrusions in all locations where the aluminum has been penetrated.  All hardware used in mounting steps, hand rails, doors, lights, or other specified components shall be individually treated with the corrosion inhibiting pre-treatment.

After the paint process is complete, the gloss rating of the unit shall be tested with a 20-degree gloss meter. Coating thickness shall be measured with a digital MIL gauge and the orange peel with a digital wave scan device.

# BODY PRIMER & PREPARATION

All exposed welds shall be ground smooth for final finishing of areas to be painted. The compartments and doors are totally degreased and phosphatized. After final body work is completed, grinding (36 and 80 grit), and finish sanding shall be used in preparation for priming.

# BODY FINISH PAINT

The body shall be finish sanded and prepared for final paint. Upon completion of final preparation, the body shall be painted utilizing the highest quality, state of the art, low V.O.C., polyurethane base paint. Finish paint shall be applied in multiple coats to ensure proper paint coverage with a high gloss finish.

The entire body shall be buffed and detailed.

# BODY PAINT

The inside and underside areas of the complete body assembly shall be painted black using a Sikkens paint system, prior to the installation of the body on the chassis or torque box.

# COMPARTMENT PAINT

The interior of the compartments shall be finish painted job color with a scuff resistant webbing type paint of a contrasting color applied over the painted surfaces.

# BODY PAINT

The body paint finish shall be Sikkens paint system in a single color, to match customer furnished paint codes and requirements.

# PUMP / PIPING PAINT

The pump enclosure and pump/plumbing within the pump enclosure shall be painted black.

# FENDER STORAGE COMPARTMENT PAINT

The interior of the fender storage compartments (if fender compartments are specified) shall be finish painted job color.

# CAB PRIMER & PREPARATION

The cab primer shall be a two (2) stage process. First stage shall be a coating with a two-part component, self-etching, corrosion resistant primer to chemically bond the surface of the metal for increased adhesion. Second stage shall be multiple coats of a catalyzed, two component polyurethane, primer applied for leveling of small imperfections and top coat sealing.

# CAB FINISH PAINT

The entire cab shall be finish sanded and prepared for final paint. Upon completion of final preparation, the cab shall be painted utilizing the highest quality, state of the art, low V.O.C., polyurethane base paint. Finish paint shall be applied in multiple coats to ensure proper paint coverage with a high gloss finish.

# CAB UNDERSIDE PAINT

The exposed areas under the cab shall be painted with a black urethane paint/primer.

The cab exterior shall be painted with Sikkens paint system to match purchaser's furnished paint codes. A two-tone paint finish shall be provided with the two-tone break line located approximately 3" below the cab side windows.

The entire exterior finish of the cab shall be buffed and detailed.

# CAB INTERIOR PAINT

The interior metal surfaces of the cab shall be painted using dark gray Line-X material.

# CHASSIS PAINT

The chassis frame rails, suspension, axles, and drivelines (with the exception of any PTO drivelines which shall be safety yellow) shall be painted job color Red with a polyurethane base paint prior to installation of any air lines or electric systems to ensure proper serviceability.

# WHEEL PAINT

The chassis wheels, (except aluminum wheels) shall be painted job color with silver trim around the perimeter. All outer wheels on the rear axle shall be job color with the inner being a color selected by the wheel manufacturer suitable for inner wheel use.

# BLACK LINE-X PAINT - EXTERIOR SURFACES

Black Line X with UV protection shall be finish painted on the following exterior surfaces:

* Front bumper gravel shield
* Driver and Officer side pump panel running boards
* Top mount pump panel walkway floor
* Forward body overlay panels
* Body rub rails
* Rear tailboard

# PAINT CODES

The paint shall match customer furnished paint code(s) and layout. The paint code(s) shall be as indicated below:

* **PRIMARY PAINT COLOR**

*Single Color: RED Paint Code# Red #3265*

* + **SECONDARY PAINT COLOR**

*Two/Tone Color: BLACK Paint code# FLNA 41532*

# TOUCH-UP PAINT

One (1) pint of each exterior color paint for touch-up purposes shall be supplied when the apparatus is delivered to the end user.

# FINALIZATION & DETAILING

Prior to delivery the vehicle, the interior and exterior be cleaned and detailed. The finalization process detailing shall include installation of NFPA required labels, checking fluid levels, sealing and caulking required areas of the cab and body, rust proofing, paint touch-up, etc.

# RUST PROOFING

The entire unit shall be thoroughly rust proofed utilizing rustproof and sound deadening materials applied in manufacturer recommended application procedures. Rust proofing shall be applied during the assembly process and upon completion to insure proper coverage in all critical areas.

# \*\*\*\* LETTERING AND STRIPING \*\*\*\*

# COMPUTER GENERATED LETTERING

The lettering and striping shall be custom designed utilizing state of the art computer software and computerized cutting machines. The manufacturer shall employ a full-time artist / designer to generate all lettering, decals, and striping to meet the requirements of the Fire Department. The artwork for the lettering and striping shall be kept on record by the apparatus manufacturer to allow for ease in duplication for the Fire Department.

# FRONT CAB DOOR LETTERING

Scotch-Lite with drop shadow lettering shall be provided on the cab drivers and officer's doors per the fire department requirements. The design of the lettering on the cab doors shall be designed to fit in the 496 sq. inches available.

Lettering provided on the driver's and officer's cab doors shall be 4" high to match current Engine 40 design.

# REAR CAB DOOR LETTERING

Scotch-Lite with drop shadow lettering shall be provided on the cab crew doors per the fire department requirements. The design of the lettering on the cab doors shall be designed to fit in the 496 sq. inches available.

Lettering provided on the crew cab doors shall be 4" high.

“E-40”

# FRONT OF CAB LETTERING

Scotch-Lite with drop shadow lettering shall be provided on the front cab grille per the fire department requirements. The design of the lettering on the front of the cab shall be designed to fit in the 167 sq. inches available.

Lettering provided on the front cab grille shall be 3" high.

"ENGINE 40"

# REAR BODY LETTERING

Scotch-Lite with dual drop shadow lettering shall be provided on the rear body compartment door. The design of the lettering on the rear of the body shall be designed to fit in the 167 sq. inches available.

"E-40" in as large of font as possible

Lettering provided on the rear door (L3 & R3) as large as possible.

# CAB ROOF LETTERING

Scotch-Lite with dual drop shadow lettering shall be provided on the cab roof per the fire department requirements. The design of the lettering on the cab roof shall be designed to fit in the 2500 sq. inches available.

Lettering provided on the cab roof shall be 12" high per Fire Department and engineering design.

# BODY SIDE SHEET LETTERING

Scotch-Lite with dual drop shadow lettering shall be provided on the body side sheet per the fire department requirements. The design of the lettering on the body side sheet shall be designed to fit in the 2500 sq. inches available.

Lettering provided on the body side sheet shall be 6" high.

“FIRE RESCUE”

# LETTERING FONT

The lettering shall be designed and cut with a basic block type font:

"BLOCK TYPE FONT"

# \*\*\*\* NFPA REQUIRED SCOTCH-LITE STRIPING \*\*\*\*

# SCOTCH-LITE STRIPE

A four (4) inch high "Scotch-Lite" stripe shall be provided. The stripe shall be applied on a minimum of 60 percent of each side of the unit, 60 percent on the rear of the unit and 40 percent on the front of the unit. The Scotch-Lite stripe layout shall be determined by the Fire Department.

The Scotch-Lite shall be white in color.

A four (4) inch simple "Z" effect shall be incorporated into the Scotch-Lite scheme on the body. Final layout of this configuration shall be determined by the Fire Department.

# SCOTCH-LITE ACCENT STRIPES

A half (1/2) inch high Scotch-Lite material accent stripe shall be incorporated into the Scotch-Lite scheme to border the primary Scotch-Lite stripe on the top and bottom edges. Final layout of this configuration shall be determined by the Fire Department.

# REAR CHEVRON STRIPING

At least 50% of the rear facing vertical surface shall be covered with alternating strips of reflective striping.

The striping shall be 6" Scotch-Lite.

The Scotch-Lite shall be Ruby Red and Lemon Yellow in color.

# \*\*\*\*\* WARRANTIES & REQUIRED INFORMATION \*\*\*\*\*

**The Bidder WARRANTY, STARTING ON DELIVERY DATE**

Warranty coverage by The Bidder will begin on the date of delivery to the customer.

**WARRANTY – CUSTOM CHASSIS**

The proposed vehicle includes a one (1) year new vehicle warranty, upon delivery and acceptance of the vehicle. The warranty will ensure that the vehicle has been manufactured to the proposed contract specifications and will be free from defects in material and workmanship that may appear under normal use and service within the warranty period. The warranty may be subject to different time and mileage limitations for specific components and parts. This warranty is issued to the original purchaser of the vehicle.

The warranty will not apply to tires, batteries, or other parts or components that are warranted directly by their manufacturers. The warranty will not apply to routine maintenance requirements as described in the service and operators manual. No warranty whether express, implied, statutory or otherwise including, but not limited to any warranty of merchantability or fitness for purpose will be imposed.

**OVERALL UNIT AND CUSTOM CHASSIS**

All components and parts of the vehicle are warranted for a period of one (1) year from acceptance of the vehicle, unless excluded elsewhere in this warranty or described as having longer time limitations.

**WARRANTY - ENGINE**

The proposed unit will be equipped with a Fire Service rated engine, which will come furnished with a five (5) year Engine Manufacturer's warranty. A copy of the manufacturer's warranty will be supplied to define additional details of the warranty provisions.

**WARRANTY - TRANSMISSION**

The proposed Allison transmission will be provided with a five (5) year warranty. A copy of the Allison transmission warranty will be supplied to the purchaser to define additional details of the warranty provisions.

**WARRANTY - CUSTOM CHASSIS FRAME RAILS**

The proposed The Bidder custom chassis frame and cross members will be warranted to the original purchaser for the life of the vehicle. A copy of The Bidder's frame rail warranty will be supplied to define additional details of the warranty provisions.

**WARRANTY - STEERING UNIT**

The proposed Sheppard steering gear will be warranted for a period of three(3) years from the first date of service or 150,000 miles (241,401 kilometers), whichever occurs first. The product will be free from defects in material and workmanship under normal use in applications approved in advance by Sheppard.

**WARRANTY - FRONT AXLE**

The Meritor axle will be provided with a two (2) year parts and labor warranty. The wheel seals, gaskets and wheel bearings will have a one (1) year warranty. A copy of Meritor's warranty will be supplied to define additional details of the warranty provisions.

**WARRANTY - REAR AXLE**

The Meritor axle will be provided with a two (2) year parts and labor warranty. The wheel seals, gaskets and wheel bearings will have a one (1) year warranty. A copy of Meritor's warranty will be supplied to define additional details of the warranty provisions.

**WARRANTY - CAB STRUCTURE**

The proposed cab will be warranted against structural defects for a period of ten (10) years from the date of acceptance of the unit. Details of warranty coverage, limitations and exclusions are included in the specific warranty document.

**WARRANTY - BODY STRUCTURE**

The proposed body will be warranted against structural defects for a period of ten (10) years from the date of acceptance of the unit. Details of warranty coverage, limitations and exclusions are included in the specific warranty document.

**WARRANTY - CORROSION**

The proposed cab and body will be warranted against rust-through or perforation, due to corrosion from within, for a period of ten (10) years. Perforation is defined as a condition in which an actual hole occurs in a sheet metal panel due to rust or corrosion from within. Surface rust or corrosion caused by chips or scratches in the paint is not covered by this warranty.

**WARRANTY - PAINT**

The proposed paint finish will be warranted for a period of ten (10) years from the date of acceptance of the unit. Details of warranty coverage, limitations and exclusions are included in the specific warranty document.

**WARRANTY - REAR SUSPENSION**

The Bidder hereby warrants to the original Buyer, that leaf spring products installed will be free of defects in material and workmanship for one (1) year. The “Warranty Period” commences on the date the original Buyer takes delivery of the product from the manufacturer.

**WARRANTY - WATER TANK**

The proposed water tank will be warranted by the water tank manufacturer for the "Lifetime" of the unit. A copy of the manufacturer's warranty will be supplied to define additional details of the warranty provisions.

**WARRANTY - FIRE PUMP**

Hale Products, Incorporated ("Hale") hereby warrants to the original buyer that products manufactured by Hale will be free of defects in material and workmanship for a period of five (5) years from the date product is first placed into service or five and one-half (5 1/2) years from date of shipment by Hale, whichever period will be first to expire. Within this warranty period Hale will cover parts and labor for the first two (2) years and parts only for years three (3) through five (5).

**WARRANTY - HEAVY DUTY VALVES**

Akron Brass Warrants Heavy Duty Swing-Out Valves for a period of ten (10) years after purchase against defects in material or workmanship. Akron Brass will repair or replace any Heavy Duty Swing Out Valve which fails to satisfy this warranty.

**NFPA REQUIRED LOOSE EQUIPMENT, PROVIDED BY FIRE DEPARTMENT**

The following loose equipment as outlined in NFPA 1901, 2016 edition in accordance with the applicable requirements unless supplied by the manufacturer or sales rep organization, will be provided by the fire department. All loose equipment will be installed on the apparatus before placed in emergency service, unless the fire department waives NFPA section 4.21.

Section 5.7 Equipment.

It is the responsibility of the purchaser to ensure that all required equipment has been supplied and installed on the apparatus in order to achieve compliance with the standard prior to placing it in service.

5.7.1 Ground Ladders.

5.7.1.1 All fire department ground ladders carried on the apparatus shall meet the requirements of NFPA 1931, Standard for Manufacturer's Design of Fire Department Ground Ladders, except as permitted by 5.7.1.3 and 5.7.1.4.

5.7.1.2 At a minimum, the following fire department ground ladders shall be carried on the apparatus:

(1) One straight ladder equipped with roof hooks

(2) One extension ladder

(3) One folding ladder

5.7.1.3 Stepladders and other types of multipurpose ladders meeting ANSI AI4.2, Ladders - Portable Metal- Safety Requirements, or ANSI A14.5, Ladders - Portable Reinforced Plastic Safely Requirements, with duty ratings of Type IA or lAA shall be permitted to be substituted for the folding ladder required in 5.7.1.2(3).

5.7.1.4 Stepladders and other types of multipurpose ladders shall be permitted to be carried in addition to the minimum fire department ground ladders specified in 5.7.1.2 provided they meet either ANSI AI4.2 or ANSI A14.5 with duty ratings of Type 1A or 1AA.

Section 5.7.2 Suction Hose or Supply Hose.

It is the responsibility of the purchaser to ensure that all required equipment has been supplied and installed on the apparatus in order to achieve compliance with the standard prior to placing it in service.

5.7.2.1 A minimum of 20 ft. (6 m) of suction hose or 15 ft. (4.5 m) of supply hose shall be carried.

5.7.2.1.1 Where suction hose is provided, a suction strainer shall be furnished.

5.7.2.1.2 Where suction hose is provided, the friction and entrance loss of the combination suction hose and strainer shall not exceed the losses listed in Table 16.2.4.1 (b) or Table 16.2.4.1(c).

5.7.2.1.3 Where supply hose is provided. It shall have couplings compatible with the local hydrant outlet connection on one end and the pump intake connection on the other end.

5.7.2.2 Suction hose and supply hose shall meet the requirements of NFPA 1961, Standard on Fire Hose.

Section 5.8 Minor Equipment.

It is the responsibility of the purchaser to ensure that all required equipment has been supplied and installed on the apparatus in order to achieve compliance with the standard prior to placing it in service.

5.8.2 Fire Hose and Nozzles. The following fire hose and nozzles shall be carried on the apparatus:

(1) 800 ft. (240 m) of 2 1/2 in. (65 mm) or larger fire hose

(2) 400 ft. (120 m) of 1 1/2 in. (38 mm), 1 3/4 in. (45 mm), or 2 in. (52 mm) fire hose

(3) One hand line nozzle. 200 gpm (750 L/min) minimum

(4) Two hand line nozzles. 95 gpm (360 L/min) minimum

(5) One play pipe with shutoff and 1 in. (25 mm), 1 1/8 in. (29 mm), and l 1/4 in. (32 mm) tips

5.8.3 Miscellaneous Equipment. The following additional equipment shall be carried on the apparatus:

(1) One 6 lb. (2.7 kg) flathead axe mounted in a bracket fastened to the apparatus

(2) One 6 lb. (2.7 kg) pick head axe mounted in a bracket fastened to the apparatus

(3) One 6 ft. (2 m) pike pole or plaster hook mounted in a bracket fastened to the apparatus

(4) One 8 ft. (2.4 m) or longer pike pole mounted in a bracket fastened to the apparatus

(5) Two portable hand lights mounted in brackets fastened to the apparatus

(6) One approved dry chemical portable fire extinguisher with a minimum 80-B:C rating mounted in a bracket fastened to the apparatus

(7) One 2 1/2 gal (9.5 L) or larger water extinguisher mounted in a bracket fastened to the apparatus

(8) One self-contained breathing apparatus (SCBA) complying with NFPA 1981, Standard on Open-Circuit Self Contained Breathing Apparatus (SCBA) for Emergency Services, for each assigned sealing position. But not fewer than four, mounted in brackets fastened to the apparatus or stored in containers supplied by the SCBA manufacturer

(9) One spare SCBA cylinder for each SCBA carried, each mounted in a bracket fastened to the apparatus or stored in a specially designed storage space

(10) One first aid kit

(11) Four combination spanner wrenches mounted in brackets fastened to the apparatus

(12) Two hydrant wrenches mounted in brackets fastened to the apparatus

(13) One double female 2 1/2 in. (65 mm) adapter with National Hose (NH) threads, mounted in a bracket fastened to the apparatus

(14) One double male 2 1/2 in. (65 mm) adapter with NH threads, mounted in a bracket fastened to the apparatus

(15) One rubber mallet, suitable for use on suction hose connections, mounted in a bracket fastened to the apparatus

(16) Two salvage covers each a minimum size of 12 ft. x 14 ft. (3.7 m x 4.3 m)

(17) Two or more-wheel chocks. Mounted in readily accessible locations, that together will hold the apparatus. When loaded to its GVWR or GCWR, on a hard surface with a 20 percent grade with the transmission in neutral and the parking brake released

(18) One traffic vest for each seating position, each vest to comply with ANSI/ISEA 207, Standard for High-Visibility Public Safety Vests, and have a five-point breakaway feature that includes two at the shoulders, two at the sides, and one at the front

(19) Five fluorescent. orange traffic cones not less than 28 in. (711 mm) in height, each equipped with a 6 in. (152 mm) retroflective white band no more than 4 in. (102 111m) from the top of the cone, and an additional 4 in. (102 mm) retroflective white band 2 in. (51 mm) below the 6 in. (152 mm) hand

(20) Five illuminated warning devices such as highway flares, unless the live fluorescent orange traffic cones have illuminating capabilities

(21) One automatic external defibrillator (AED)

5.8.3.1 If the supply hose carried does not use sexless couplings, an additional double female adapter and double male adapter, sized to fit the supply hose carried, shall be carried mounted in brackets fastened to the apparatus.

5.8.3.2 If none of the Pump intakes are valved, a hose appliance that is equipped with one or more gated intakes with female swivel connection(s) compatible with the supply hose used on one side and a swivel connection with pump intake threads on the other side shall be carried. Any intake connection larger than 3 in. (75 mm) shall include a pressure relief device that meets the requirements of 16.6.6.

5.8.3.3 If the pumper is equipped with an aerial device with a permanently mounted ladder, four ladder belts meeting the requirements of NFPA 1983, Standard on Life Safety Rope and Equipment for Emergency Services shall be provided.

5.8.3.4 If the apparatus does not have a 2 1/2 in. intake with NH threads, an adapter from 2 1/2 in. NH female to a pump intake shall be carried, mounted in a bracket fastened to the apparatus if not already mounted directly to the intake.

5.8.3.5 If the supply hose carried has other than 2 1/2 in. NH threads, adapters shall be carried to allow feeding the supply hose from a 2 1/2 in. NH thread male discharge and to allow the hose to connect to a 2 1/2 in. NH female intake, mounted in brackets fastened to the apparatus if not already mounted directly to the discharge or intake.

14.1.8.4 Fire Helmet.

It is the responsibility of the purchaser to ensure that "Fire helmets shall not be worn by persons riding in enclosed driving and crew areas any time the apparatus in placed in service.

14.1.8.4.1 A location for helmet storage shall be provided.

14.1.8.4.2 If helmets are to be stored in the driving or crew compartment, the helmets shall be secured in compliance with 14.1.11.2.

14.1.10 SCBA Mounting.

It is the responsibility of the purchaser to ensure that any SCBA equipment has been supplied and installed on the apparatus in order to achieve compliance with the standard prior to placing it in service.

14.1.10.1 Where SCBA units are mounted within a driving or crew compartment, a positive latching mechanical means of holding the SCBA device in its stowed position shall he provided such that the SCBA unit cannot be retained in the mount unless the positive latch is engaged.

14.1.10.2 The bracket holding device and its mounting shall retain the SCBA unit when subjected to a 9 G force and shall be installed in accordance with the bracket manufacturer's requirements.

14.1.10.3 If the SCBA unit is mounted in a seat back, the release mechanism shall be accessible to the user while seated.

14.1.11 Equipment Mounting.

It is the responsibility of the purchaser to ensure that any equipment installed on the apparatus by them or their subcontractor meets the following requirements prior to placing it in service.

14.1.11.1 All equipment required to be used during an emergency response shall be securely fastened.

14.1.11.2 All equipment not required to be used during an emergency response, with the exception of SCBA units, shall not be mounted in a driving or crew area unless it is contained in a fully enclosed and latched compartment capable of containing the contents when a 9 G force is applied in the longitudinal axis of the vehicle or a 9G force is applied in any other direction, or the equipment is mounted in a bracket(s) that can contain the equipment when the equipment is subjected to those same forces.

Section 15.9.3 Reflective Striping.

It is the responsibility of the purchaser to ensure that Reflective Striping has been supplied and installed on the apparatus in order to achieve compliance with the standard prior to placing it in service.

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

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

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

15.10 Hose Storage.

It is the responsibility of the purchaser to ensure that any hose storage area includes a positive means to prevent unintentional deployment in order to achieve compliance with the standard prior to placing it in service.

15.10.7 Any hose storage area shall be equipped with a positive means to prevent unintentional deployment of the hose from the top, sides, front, and rear of the hose storage area while the apparatus is underway in normal operations.