Rhode Island Airport Corporation

March 18, 2016

Invitation for Bid No. 26327
Airport Rescue and Firefighting (ARFF) Rescue Pumper Apparatus

The Rhode Island Airport Corporation (RIAC) is soliciting sealed bids for one custom built ARFF Rescue Pumper apparatus. Please do not include financing information as part of the bid package as RIAC is seeking alternative financing.

Sealed bids will be received at: Rhode Island Airport Corporation, Office of Procurement, 3rd Floor, T. F. Green Airport, 2000 Post Road, Warwick RI 02886-1533. The bidder must submit one (1) original and one (1) copy ("Public Copy") of the Response Forms.

Due date for bids is no later than 10:00 a.m. local time, April 7, 2016, at which time they will be publicly opened. Bids must be in a sealed envelope clearly marked **"ARFF Rescue Pumper – IFB No. 26327"**. RIAC will not accept late bids under any circumstances. All costs incurred in connection with responding to this Invitation for Bids (IFB) shall be borne by the bidder.

In order to control the dissemination of information regarding this IFB, organizations interested in submitting a bid shall not make personal contact with any member of the RIAC staff. Questions concerning this IFB should be directed, via email, to procurement@pvdairport.com no later than **NOON 12:00 p.m. local time, March 28, 2016.** RIAC will respond to all relevant questions via addendum. This addendum will be posted to RIAC's website (www.pvdairport.com/corporate/procurement) and to the State of Rhode Island's Division of Purchasing website (www.purchasing.ri.gov/).

RIAC reserves the right to waive any irregularities and to reject any and all bids on any basis without disclosing the reason. As part of the bid package, include a complete description of the product. Some latitude in meeting the precise specifications will be allowed, when demonstrated, that as equivalent features or specifications are being offered. However, RIAC will be the sole judge in determining the acceptance of as equivalent features or specifications.

Delivery of the ARFF Rescue Pumper will be required within 250 calendar days of notice of award, or as otherwise agreed upon in writing by RIAC. The ARFF Rescue Pumper apparatus will be delivered, as specified, in ready to work condition to T.F. Green Airport, Operations and Maintenance Facility, 300 Airport Rd, Warwick, Rhode Island. To insure proper break in of all components while still under warranty, vehicle shall be delivered under its own power, rail or truck freight shall not be acceptable. Do not include state sales or federal excise tax as part of your bid price, as RIAC is exempt from these taxes.

Procedures regarding bids and the selection of contractors shall be in conformity with all federal regulations including 49 CFR, Part 18.36 and Title 37, Chapter 2 of the General Laws of the State of Rhode Island and RIAC procurement rules.

Chief John Thomas
Airport Rescue and Firefighting

Jeffrey Goulart
AVP Financial Administration

INSURANCE

The manufacturer shall carry commercial general liability insurance including coverage for the products-completed operations exposure, with limits of not less than $1,000,000 Each occurrence (Bodily Injury and Property Damage), $1,000,000 Products/Completed Operations Aggregate and $5,000,000 General Aggregate. This insurance shall act as primary and non-contributory. RIAC shall be added as an additional insured on such insurance. A Certificate of Insurance showing that this minimum amount of coverage is currently in force shall be included in the bid package.

PERFORMANCE BOND

A performance bond in the amount of 100% of the contract price shall be provided within ten (10) days of contract award.

SPECIFICATIONS

Refer to attached document “Specifications for a Custom Built Rescue Pumper”.
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IFB No. 26327
ARFF Rescue Pumper Apparatus
Response Form

Responses are **due no later than 10:00 a.m., April 7, 2016** at Rhode Island Airport Corporation, T. F. Green Airport, Office of Procurement, 2000 Post Road, 3rd floor, Warwick RI 02886-1533. Vendors may copy/scan these pages to facilitate completing the information, but must return response in this format/order.

The undersigned, on behalf of the bidder, certifies that: This offer is made without previous understanding, agreement or connection with any person, firm, or corporation entering a bid on the same project; is in all respects fair and without collusion or fraud. The person whose signature appears below is legally empowered to bind the company in whose name the bid is entered. They have read the entire document and understand all provisions. If accepted by RIAC this bid is guaranteed as written and amended and will be implemented as stated.

Firm Name _____

Contact _____

Signature _____ Title _____

Address _____ City/State _____ Zip _____

Phone _____ Fax _____ Hours _____

Taxpayer I.D. Number _____

Company Web Site Address _____ E-Mail _____

General Nature of Business _____

Type or Organization (check one):

Sole Proprietorship __ Partnership__ Incorporated__ Public Corporation__ Private Corporation__

Minority Business Enterprise __ Woman-Owned Business Enterprise __

Small Business Enterprise __

Manufacturer _____ Distributor _____ Retail _____ Dealer _____ Service _____

Number of Locations _____ Number of Persons Employed _____

We Acknowledge Receipt Of These Addenda: No.____, Dated _____; No. ____, Dated _____

Has any person, firm, or corporation entering a proposal on the project been disbarred or suspended by the State of Rhode Island? If so indicate dates and explanation for such.

_____

ALL vendors interested in responding MUST provide the following requested information in this format. Additional information may be included on accompanying sheets if necessary.

1. Any additional information necessary to assist RIAC in evaluating your bid may be listed here.

_____

_____

2. Provide references from at least (3) fire departments/municipalities in the region, with contact information for the Chief or other executive officer of said departments, which have purchased multiple fire apparatus' within the past eight (8) years.

a. Name of Facility, Group, Organization or Firm_____

Address _____

Contact Person_____Phone Number _____

Email _____Date of Purchases_____

Type(s) of Fire Apparatus Purchased_____

a. Name of Facility, Group, Organization or Firm_____

Address _____

Contact Person_____Phone Number _____

Email _____Date of Purchases_____

Type(s) of Fire Apparatus Purchased_____

a. Name of Facility, Group, Organization or Firm_____

Address _____

Contact Person_____Phone Number _____

Email _____Date of Purchases_____

Type(s) of Fire Apparatus Purchased_____

3. Please use the following sheet to explain all deviations from the SPECIFICATIONS and MANDATORY REQUIREMENTS marked 'No' in **Appendix B**. Please provide documentation to verify compliance with the minimum specifications on a similar or equivalent basis. Bidder may use additional sheets, if necessary.

SECTION NO.	REASON FOR DEVIATION	DESCRIPTION OF REPLACEMENT COMPONENT, AND/OR EXPLANATION

4. Pricing Information in Words and Numbers

Total Quoted Price for Vehicle with 1000 gallon water tank **(required)**: $_____
(In Numbers)

_____
(In Words)

Total Quoted Price for Vehicle with 1250 gallon water tank **(optional)**: $_____
(In Numbers)

_____
(In Words)

(If there is a discrepancy between words and numbers, word shall govern.)

5. Attach completed Bid Compliance Worksheet (Appendix B).

"NO BID" RESPONSE FORM

To submit a "No Bid" response for this project, this form must be completed for your company to remain on our bidders list for commodities/services referenced. If you do not respond your name may be removed from this bidders list.

Note: Please show the solicitation number on the outside of the envelope.

Please check statement(s) applicable to your "No Bid" response –

- o Specifications are restrictive; i.e. geared toward one brand or manufacturer only (explain below).
- o Specifications are ambiguous (explain below).
- o We are unable to meet specifications.
- o Insufficient time to respond to the solicitation.
- o Our schedule would not permit us to perform.
- o We are unable to meet bond requirements.
- o We are unable to meet insurance requirements.
- o We do not offer this product or service.
- o Remove us from your vendor list for this commodity/service.
- o Other (specify below).

Comments:

_____

_____

_____

_____
Company Name (as registered with the IRS)

_____
Authorized Signature

_____ _____
Correspondence Address Printed Name

_____ _____
City, State, Zip Title

_____ _____ /
Date Telephone/Fax

Terms and Conditions

In submitting a response to this Invitation for Bids, vendors hereby understand the following:

1. All project participants, consultants, engineers, and contractors, must comply with all applicable federal, state laws and RIAC rules and regulations pertaining to contracts entered into by governmental agencies, including non-discriminating employment. Contracts entered into on the basis of submitted bids are revocable if contrary to law.

2. Alternate bids (two or more bids submitted) will be considered for award. RIAC reserves the right to make the final determination of actual equivalency or suitability of such bids with respect to requirements outlined herein.

3. The bids submitted, and any further information acquired through interviews, will become, and are to be considered, a part of the final completed contract. If there is any variance or conflict, the bid specifications, conditions, and requirements shall control.

4. Prices offered may not be withdrawn for a period of 90 days immediately following the opening of this Bid. Prices MUST also be free of federal, state and local taxes unless otherwise imposed by a governmental body, and applicable to the material on the bid.

5. Bidder MUST return the original attached Response Forms as noted previously on the bid due date.

6. Envelopes containing responses must be sealed and marked on the lower left-hand corner with the firm name and address bid number, date, and time.

7. RIAC interprets the term "lowest responsible bidder" as requiring RIAC to: (a) choose between the kinds of materials, goods, wares, or services subject to the bid, and (b) determine which bid is most suitable for its intended use or purpose. RIAC can consider, among other factors, such things as labor cost, service and parts availability, availability of materials and supplies, and maintenance costs of items upon which bids are received. RIAC can determine any differences or variations in the quality or character of the material, goods, wares, or services performed or provided by the respective bidders.

8. All requested information must be supplied. If you cannot respond to any part of this request, state the reason you cannot respond. You may provide supplemental information, if necessary, to assist RIAC in analyzing your bid.

9. A purchase order and/or contractual agreement constitutes RIAC's offer to the service provider upon the terms and conditions stated herein, and shall become binding meeting the terms set forth herein when it is accepted by acknowledgment or performance.

10. After award, if the successful bidder/supplier refuses or fails to make deliveries of the materials and or services within the times specified in the Invitation for Bids, purchase order, or contractual agreement, RIAC may, by written notice, terminate the contract OR purchase order.

11. The supplier shall hold and save RIAC, The State of Rhode Island, and its officers, agents, servants/employees harmless from liability of any patented or unpatented invention, process, article, or appliance manufactured, or used in the performance of the contract, including its use by RIAC.

12. Payment of the seller's invoices is subject to adjustment.

13. The Bidder agrees that:

a. He/she shall not discriminate against any person under the present contract because of race, religion, color, sex, national origin, ancestry, or physical handicap;
b. In all solicitations or advertisements for employees, he/she shall include the phrase, 'Equal Opportunity Employer,' or a similar phrase;
c. If he/she fails to comply, he shall be deemed to have breached the present contract, and it may be canceled, terminated, or suspended, in whole or in part, by RIAC;
d. If he/she is found guilty of discrimination under a decision, he/she shall be deemed to have breached the present contract, and it may be canceled, terminated, or suspended, in whole or in part, by RIAC; and,
e. He/she shall include the provisions of subsections (a) through (d) inclusively of this paragraph in every subcontract or purchase order so that such provision will be binding upon such subcontractor or vendor.

14. RIAC shall retain the right to reject any and/or all bids received, and responses to this and/or related documents, if determined to be non-responsive in any form, or if determined to be in the best interest of RIAC.

15. The firm responding to this bid proposes to furnish all materials, labor, supplies, equipment and incidentals necessary to provide the equipment/materials/services described herein in accordance with the, Addenda, Contract, Bonds, Insurance, Plans, Specifications, Mandatory Requirements and Conditions.

16. If a response to this Invitation for Bids is accepted, the Bidder agrees to execute and deliver to RIAC a contract in accordance with the Contract Documents (if applicable) within ten days of notice of the award to the Bidder. The Bidder agrees that the surety/deposit given concurrently herewith shall become the property of RIAC in the event the Bidder fails to execute and deliver such contract within the specified time. In the further event of such failure, the Bidder shall be liable for RIAC's actual damages that exceed the amount of the surety.

17. It shall be understood that time is of the essence in the bidder performance. The bidder agrees that RIAC's damages would be difficult or impossible to predict in the event of a default in the performance hereof; and it is therefore agreed that if the bidder defaults in the performance of the Contract Documents, the bidder shall be liable for payment of the sums stipulated in the Contract Documents as liquidated damages, and not as a penalty.

18. The bidder hereby certifies that he/she has carefully examined all of the documents for the project, has carefully and thoroughly reviewed this Invitation for Bids, that he/she has inspected the location of the project (if applicable), and understands the nature and scope of the work to be done; and that this bid is based upon the terms, specifications, requirements, and conditions of the Invitation for Bids and documents. The Bidder further agrees that the performance time specified is a reasonable time, having carefully considered the nature and scope of the project as aforesaid.

19. All products/services and related equipment proposed and/or affected by acquisitions or purchases made as a result of the response to this document shall be compliant with existing RIAC hardware, software, and applications where applicable. Verification must be provided in the response to this document.

20. The Bidder certifies that this proposal is submitted without collusion, fraud or misrepresentation as to other Bidders, so that all bids for the project will result from free, open and competitive bidding among all vendors.

21. It shall be understood that any bid and any/all referencing information submitted in response to this Invitation for Bids shall become the property of RIAC, and will not be returned. RIAC will use discretion with regards to disclosure of proprietary information contained in any response, but cannot guarantee that information will not be made public. As a governmental entity, RIAC is subject to making records available for disclosure after Board approval of the recommendation.

22. RIAC will not be responsible for any expenses incurred by any vendor in the development of a response to this Invitation for Bids. Further, RIAC shall reserve the right to cancel the work described herein prior to issuance and acceptance of any contractual agreement/purchase order by the recommended vendor even if RIAC has formally accepted a recommendation.

23. Bids must be received prior to the time and dates listed to be considered responsive. RIAC will not "accept" late responses and will return them to the sender. Further, RIAC will NOT: (1) guarantee security of the document received; and (2) be held responsible for bids which are NOT legible (and may choose to reject such responses).

24. By submission of a response, the Bidder agrees that at the time of submittal, he/she: (1) has no interest (including financial benefit, commission, finder's fee, or any other remuneration) and shall not acquire any interest, either direct or indirect, that would conflict in any manner or degree with the performance of Bidder's services, or (2) benefit from an award resulting in a "Conflict of Interest." A "Conflict of Interest" shall include holding or retaining membership, or employment, on a board, elected office, department or bureau, or committee sanctioned by and/or governed by RIAC. Bidders shall identify any interests, and the individuals involved, on separate paper with the response and shall understand that RIAC, at the discretion of the Purchasing Director in consultation with RIAC Counselor, may reject their bid.

25. Campaign Finance Compliance - Every person or business entity providing goods or services at a cost of $5,000 cumulated value is required to file an affidavit regarding political campaign contributions with the RI State Board of Elections even if no reportable contributions have been made. (RI General Law 17-27) Forms obtained at Board of Elections, Campaign Finance Division, 50 Branch Avenue, Providence, RI 02904 (401-222-2056).

26. Major State Decision-Maker - Does any Rhode Island "Major State Decision-Maker", as defined below, or the spouse or dependent child of such person, hold (i) a ten percent or greater equity interest, or (ii) a Five Thousand Dollar or greater cash interest in this business?

    For purposes of this question, "Major State Decision-Maker" means:

    (i) All general officers; and all executive or administrative head or heads of any state executive agency enumerated in R.I.G.L § 42-6-1 as well as the executive or administrative head or heads of state quasi-public corporations, whether appointed or serving as an employee. The phrase "executive or administrative head or heads" shall include anyone serving in the positions of president, senior vice president, general counsel, director, executive director, deputy director, assistant director, executive counsel or chief of staff;

    (ii) All members of the general assembly and the executive or administrative head or heads of a state legislative agency, whether appointed or serving as an employee. The phrase "executive or administrative head or heads" shall include anyone serving in the positions of director, executive director, deputy director, assistant director, executive counsel or chief of staff;

    (iii) All members of the state judiciary and all state magistrates and the executive or administrative head or heads of a state judicial agency, whether appointed or serving as

an employee. The phrase "executive or administrative head or heads" shall include anyone serving in the positions of director, executive director, deputy director, assistant director, executive counsel, chief of staff or state court administrator,

If your answer is “Yes”, please identify the Major State Decision-Maker, specify the nature of their ownership interest, and provide a copy of the annual financial disclosure required to be filed with the Rhode Island Ethics Commission pursuant to R.I.G.L. §36-14-16, 17 and 18.

SPECIFICATIONS FOR A CUSTOM BUILT RESCUE PUMPER

GENERAL REQUIREMENTS

1. INTENT OF SPECIFICATIONS

It shall be the intent of these specifications to cover the furnishing and delivery of a complete fire apparatus for Rhode Island Airport Corporation (RIAC), T.F. Green Airport Fire-Rescue. These detailed specifications cover the requirements as to the type of construction, finish, equipment, and tests to which the fire apparatus shall conform. Minor details of construction and materials, which are not otherwise specified, are left to the discretion of the bidder.

Where a number, size, or other dimension is used in this specification, it is to be considered a minimum requirement, even if the word "minimum" does not precede the number.

It is also the intent of this specification for the vehicle to comply, as completely as possible, with the requirements of the National Fire Protection Association's (NFPA) standard 1901, *Standard for Automotive Fire Apparatus*, 2016 edition. Even if not listed by this specification, the requirements of NFPA 1901 shall also be required. Certain requirements of NFPA 1901 may not be consistent with RIAC's needs; in such a circumstance, the requirements will be waived by this specification. No requirement of NFPA 1901 shall be waived by the bidder without prior expressed written consent of RIAC.

2. INSTRUCTIONS TO BIDDERS

All bidders are urged to carefully read all sections of this specification.

Bids shall only be considered from companies that have an established reputation in the field of fire apparatus construction.

Each bid shall be accompanied by a set of manufacturer's specifications consisting of a detailed description of the apparatus, construction methods, and equipment proposed to which the apparatus furnished under contract shall conform. These specifications shall indicate size, type, model and make of all components parts and equipment, providing proof of compliance with each and every item in the specifications. A letter only, even though written on company letterhead, shall not be sufficient. An exception to this requirement shall not be acceptable.

RIAC will utilize this specification to compare all submitted bid proposals. **To facilitate comparison, all bid proposals must include Appendix B**. Any bidder who fails to submit Appendix B, or who submits these specifications as their own construction details will be deemed non-responsive.

RIAC's specification shall, in all cases, govern the construction of the apparatus, unless a properly documented exception or deviation is approved by RIAC. Any bid indicating that the manufacturer's

proposal will supersede RIAC's specification, without justification or approval by RIAC, will be considered a complete substitute and immediately deemed non-responsive. The successful bidder will be the bidder who most responsibly meets the requirements of this specification at the lowest bid price.

3. EXCEPTIONS

These specifications are based upon design and performance criteria which have been developed by T.F. Green Airport Fire-Rescue as a result of extensive research and careful analysis of present and future needs. Subsequently, these specifications reflect the only type of fire apparatus that is acceptable at this time and all specifications herein contained are considered as minimum. Therefore, the possibility exists that exceptions to the specifications may not be accepted.

Bidders shall indicate in the "yes/no" column of the worksheet provided in Appendix B if their bid complies on each item (paragraph) specified.

If a product brand name is specified and is commercially available to all bidders, an exception to such items is not acceptable and such bid may be rejected.

Exceptions shall be allowed if they are equal to or superior to that specified, and provided they are listed and fully explained in Item 3 of the Response Form. All deviations, no matter how slight, shall be clearly explained in Item 3 of the Response Form, in the bid sequence, citing the paragraph number(s) of the specifications, how the proposal deviation is different, how the deviation meets or exceeds the specifications and why it is necessary, and entitled "EXCEPTIONS TO SPECIFICATIONS". RIAC reserves the right to require a bidder to provide proof in each case that a substituted item is equal to that specified. RIAC shall be the sole judge in determination of acceptable substitutes. All exceptions received will be evaluated as to their acceptability.

4. GENERAL DESIGN AND CONSTRUCTION

The cab, chassis, pump module, and body are to be entirely designed, assembled and painted by the prime vehicle manufacturer, which minimizes third party involvement on engineering, design, service and warranty issues.

All bidders shall provide a list of the company, manufacturing location, and engineering source for each individual major component, including but not limited to the welded cab assembly, the pump house module assembly, the chassis assembly, body, and electrical system.

The apparatus shall be designed with due consideration to distribution of load between the front and rear axles. Weight balance and distribution shall be in accordance with the recommendations of NFPA 1901.

The bidder shall make accurate statements as to the apparatus weight and dimensions.

5. APPROVAL DRAWINGS

A scaled, dimensioned drawing of the proposed apparatus shall be provided for approval before construction begins. The sales representative shall also have a copy of the same drawing. The finalized

and approved drawing shall become part of the contract documents. This drawing shall indicate the chassis make and model, location of the lights, siren, horns, compartments, major components, etc. The drawing shall be dimensioned in inches, showing, at a minimum, overall length, width (both cab/body with and without mirrors), and height with all installed components, wheelbase, compartment sizes, and other major components.

After receiving corrections to the approval drawing from T.F. Green Airport Fire-Rescue, a "revised" approval drawing of the apparatus shall be prepared and submitted by the manufacturer to RIAC showing any changes made to the approval drawing.

Three (3) copies shall be provided to RIAC for each distribution of approval drawings.

6. PRELIMINARY PUMP OPERATOR'S PANEL LAYOUT DRAWING

A detailed drawing to scale, of the pump operator's panel shall be provided for the purpose of illustrating the standard location(s) of controls and discharges on the pump operator's panel. The drawing shall not be meant as an approval, or final construction drawing, rather it shall be used as an illustration drawing of a standard panel layout. This drawing shall include all of the gauges and controls located on the pump operator's panel.

Final layout of the pump panel will be made at the factory Preconstruction Conference.

7. QUALITY AND WORKMANSHIP

All steel welding shall follow American Welding Society D1.1-2004 recommendations for structural steel welding. All aluminum welding shall follow American Welding Society and ANSI D1.2-2003 requirements for structural welding of aluminum. All sheet metal welding shall follow American Welding Society B2.1-2000 requirements for structural welding of sheet metal. Flux core arc welding to use alloy rods, type 7000, American Welding Society standards A5.20-E70T1. Employees classified as welders are tested and certified to meet the American Welding Society codes upon hire and every three (3) years thereafter. The manufacturer shall be required to have an American Welding Society certified welding inspector in plant during working hours to monitor weld quality.

The manufacturer shall also be certified to operate a Quality Management System under the requirements of ISO 9001. These standards sponsored by the International Organization for Standardization (ISO) specify the quality systems that shall be established by the manufacturer for design, manufacture, installation and service. **A copy of the certificate of compliance shall be included with the bid**.

8. DELIVERY

Apparatus, to insure proper break in of all components while still under warranty, shall be delivered under its own power - rail or truck freight shall not be acceptable. Delivery of the vehicle shall be within **250 calendar days** of the bid award, or as otherwise agreed upon in writing by RIAC.

Delivery shall be to the RIAC Operations and Maintenance Facility, 300 Airport Rd, Warwick, Rhode Island. Delivery shall be coordinated with the Chief of T.F. Green Airport Fire-Rescue.

9. MANUALS AND SERVICE INFORMATION

The manufacturer shall supply, at time of delivery, complete operation and maintenance manuals covering the complete apparatus as delivered. These manuals shall be provided in one hard copy and one electronic (CD-ROM) copy. A permanent plate shall be mounted in the driver's compartment which specifies the quantity and type of fluid required including engine oil, engine coolant, transmission, pump transmission lubrication, pump primer, and drive axle.

10. PERFORMANCE TESTS AND REQUIREMENTS

A road test shall be conducted with the apparatus fully loaded and a continuous run of ten (10) miles or more shall be made under all driving conditions, during which time the apparatus shall show no loss of power or overheating. The transmission drive shaft or shafts, and rear axle shall run quietly and be free from abnormal vibration or noise throughout the operating range of the apparatus. Vehicle shall adhere to the following parameters:

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

B) The apparatus shall be capable of accelerating to 35 mph from a standing start within 25 seconds on a level concrete highway without exceeding the maximum governed rpm of the engine.

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

D) The apparatus, fully loaded, shall be capable of obtaining a speed of 50 mph on a level concrete highway with the engine not exceeding the governed rpm (full load).

11. FAILURE TO MEET TEST

In the event the apparatus fails to meet the test requirements of these specifications on the first trial, second trials may be made at the option of the bidder within 30 days of the date of the first trial. Such trials shall be final and conclusive and failure to comply with these requirements shall be cause for rejection. Failure to comply with changes to conform to any clause of the specifications, within 30 days after notice is given to the bidder of such changes, shall also be cause for rejection of the apparatus. Permission to keep or store the apparatus in any building owned or occupied by RIAC or its use by RIAC during the above-specified period with the permission of the bidder shall not constitute acceptance.

12. DEALERSHIP SERVICE AND WARRANTY SUPPORT

To insure full service after delivery, the selling bidder/dealership must be capable of providing service when required.

The bidder/dealership shall show that the company is in position to render prompt service and to furnish replacement parts.

Each bidder/dealership must be able to display that they are actively in the fire apparatus service business by operating a factory authorized service center and parts repository capable of satisfying the warranty service requirements and parts requirements of the vehicle(s) being purchased.

The bidder/dealership must state the location of this authorized service center. This service center must have a staff of factory-trained mechanics, well versed in all aspects of service for all major components of the apparatus. The service center must be within one hundred ten (110) road travel miles of T.F. Green Airport.

The service center shall have the following minimum qualifications:

- Total in-house body shop capability
- Down-draft paint booth with environmental approval of sufficient size as to hold the specified apparatus.
- Pump mechanics certified by the pump manufacturer
- Automotive electricians trained by the apparatus manufacturer
- Shop computer with analytical software to communicate with electronic components on the specified apparatus
- Body repair and painting staff
- Certified Master ASE and EVT Technicians
- Warranty center for Detroit Diesel, Allison Transmission, Hendrickson, Meritor, and the manufacturer of the pump utilized on this vehicle.
- Daily parts delivery to the customer location
- DOT inspection station
- Truck wheel alignment system
- Air Conditioning Analyzer for the manufacturer of the air conditioning system installed on the vehicle
- Air Conditioning Technicians certified by the state the dealership is located in.

Current certifications shall be furnished at time of bid.

13. MANUFACTURER SERVICE AND WARRANTY SUPPORT

The manufacturer shall stock sufficient parts to guarantee delivery to T.F. Green Airport within 48 hours of a parts order being placed to ensure quick response and minimize down time. The bidder shall provide detailed documentation of service and replacement part resources.

Parts identification shall be provided to both the dealer and RIAC Vehicle Maintenance through an on line web based application for the specific truck reflected in this specification. The online web application will provide the ability to view complete bills of materials, digital photographs, parts drawings, assembly drawings, and access to all current operation, maintenance and service publications.

The manufacturer must also maintain a 24 hour/ 7 day a week, toll free emergency hot line.

The manufacturer shall employ a staff of adequate size specifically dedicated to providing customer support and parts for the fielded fleet of vehicles it has produced. The manufacturer must be capable of providing both in-house and on-site service for the apparatus.

The manufacturer shall offer regional factory hands-on repair and maintenance training classes.

The manufacturer shall employ certified Emergency Vehicle Technicians (EVT) technicians on staff to provide technical expertise in the repair of fire apparatus.

It is intended that RIAC's Vehicle Maintenance department will conduct maintenance on the vehicle, and that the manufacturer and local dealership will work in coordination with RIAC Vehicle Maintenance in general maintenance and repairs.

14. SINGLE SOURCE MANUFACTURER

Bids shall only be accepted from a single source apparatus manufacturer. The definition of single source is a manufacturer that designs and manufactures their products using an integrated approach, including the chassis, cab weldment, cab, pump house (including the sheet metal enclosure, valve controls, piping and operator's panel) and body being designed, fabricated and assembled on the bidder's premises. The electrical system (hardwire or multiplex) shall be both designed and integrated by the same apparatus manufacturer. The warranties relative to these major components (excluding component warranties such as engine, transmission, axles, pump, etc.) must be from a single source manufacturer and not split between manufacturers (i.e. body, pump house, cab weldment and chassis). The bidder shall provide evidence that they comply with this requirement.

The bidder shall state the location of the factory where the apparatus is to be built.

15. NFPA 1901, 2016 EDITION STANDARDS

This unit shall comply with the requirements of NFPA 1901, *Standard for Automotive Fire Apparatus*, 2016 edition, with an effective date of January 1, 2016, with the exception of requirements in this specification that differ from NFPA 1901.

Certification of slip resistance of all stepping, standing and walking surfaces shall be supplied with delivery of the apparatus.

The manufacturer shall have programs in place for training, proficiency testing and performance for any staff involved with certifications.

An official of the company shall designate, in writing, who is qualified to witness and certify test results.

16. NFPA COMPLIANCE

Equipment in this specification not falling within the scope of NFPA 1901 shall meet the applicable requirements of the most recent edition of the applicable National Fire Protection Association standard at

time of contract execution. Any requirements of this specification that differ from NFPA requirements will be identified in this specification.

17. VEHICLE INSPECTION PROGRAM CERTIFICATION

As RIAC does not have the staff or expertise to witness the vehicle's construction, to assure the vehicle is built to current NFPA standards, the apparatus in its entirety shall be third-party, independent, audit-certified through Underwriters Laboratory (UL) that it is built and complies to all applicable standards in the current edition of NFPA 1901. The certification includes: all design, production, operational, and performance testing of not only the apparatus, but those components that are installed on the apparatus. There shall be no exceptions to this requirement.

A placard shall be affixed in the driver's side area stating the third party agency, the date, the standard and the certificate number of the whole vehicle audit.

18. PUMP TEST

The pump shall be tested, approved, and certified by Underwriter's Laboratory at the manufacturer's expense. The test results and the pump manufacturer's certification of hydrostatic test; the engine manufacturer's certified brake horsepower curve; and the manufacturer's record of pump construction details shall be provided to RIAC at the time of delivery.

19. GENERATOR TEST

The hydraulic generator shall be tested, approved, and certified by Underwriters Laboratories at the manufacturer's expense. The test results shall be provided to RIAC at the time of delivery.

20. PRECONSTRUCTION AND FINAL INSPECTION TRIP(S)

The successful bidder shall reimburse RIAC for up to a maximum of $4,000 for two (2) factory inspection trip(s) for two (2) members of T. F. Green Airport Fire-Rescue. The first trip shall be within 45 days of the awarding of the contract, for the purpose of finalizing the design details of the vehicle with the factory's design and engineering department, and to witness other similar vehicles in production. The second inspection trip shall be for the purpose of final inspection prior to the vehicle leaving the factory to ensure compliance with the requirements of this specification. The inspection trip(s) shall be scheduled at times mutually agreed upon. All costs such as travel, lodging and meals are subject to RIAC's Travel Policy.

21. CONTRACT

The Invitation for Bid, Specifications, Addenda, Purchase Order (PO) and bidder's submission along with a signed award letter will serve as our contractual obligation.

22. NEW AND UNUSED

All components shall be new and unused (with the exception of use incidental to the construction, testing, transport and delivery of the apparatus). Any old or used components shall constitute grounds for automatic rejection of the entire apparatus.

Bidders must identify by manufacturer and model number purchased components utilized in the apparatus proposed in the bid submission. In order to make valid comparisons between bids, components must be accurately identified. Therefore any bid or technical proposal which does not so identify the components being offered will not be considered.

Any potential to utilize progress payment discounts must be defined clearly in the bidder's proposal.

23. CONSTRUCTION REVIEW AND WEEKLY PROGRESS REPORTS

The successful bidder shall provide weekly progress reports as follows:

1) Comprehensive review of the bid documents with the factory order to ensure accuracy.

2) Weekly progress reports including photographs of the apparatus or the major components as they are being constructed. The reports shall commence at the beginning of the manufacturing process and shall continue until just prior to the final inspection. The reports shall show the progress of the apparatus through the course of each week. Special attention shall be given to show the unique features and aspects of the apparatus as construction progresses.

3) In addition, after the final inspection has been completed by RIAC, a complete review of all items noted in the inspection for completion is required prior to the apparatus leaving the manufacturing facility for delivery.

WARRANTIES

All warranties on the apparatus shall begin upon transfer of title or certification of origin to the Rhode Island Airport Corporation.

24. ONE (1) YEAR VEHICLE MATERIAL AND WORKMANSHIP

The entire vehicle shall be provided with a minimum one (1) year basic apparatus material and workmanship limited warranty. The warranty shall cover such portions of the apparatus built by the manufacturer as being free from defects in material and workmanship that would arise under normal use and service.

A copy of the warranty certificate shall be submitted with the bid package.

25. THREE (3) YEAR CHASSIS MATERIAL AND WORKMANSHIP

The new chassis shall be provided with a three (3) year material and workmanship limited warranty. The warranty shall cover such portions of the chassis built by the manufacturer as being free from structural failures caused by defects in material and workmanship that would arise under normal use and service.

A copy of the warranty certificate shall be submitted with the bid package.

26. FIFTY (50) YEAR STRUCTURAL INTEGRITY WARANTY

The chassis frame and cross members shall be provided with a minimum fifty (50) year material and workmanship limited warranty. The warranty shall cover the chassis frame, cross members, and fastening system as being free from defects in material and workmanship that would arise under normal use and service.

A copy of the warranty certificate shall be submitted with the bid package.

27. THREE (3) YEAR FRONT AXLE MATERIAL AND WORKMANSHIP WARRANTY

The independent front suspension shall be provided with a three (3) year material and workmanship limited warranty. The manufacturer's warranty shall provide that the independent front suspension and steering gears be free from any defect related to material and workmanship on the portion of the apparatus built by the manufacturer that would arise under normal use and service. A copy of the warranty certificate shall be submitted with the bid package.

28. THREE (3) YEAR STEERING GEAR WARRANTY

A Sheppard three (3) year limited steering gear warranty shall be provided. A copy of the warranty certificate shall be submitted with the bid package.

29. TWO (2) YEAR REAR AXLE MATERIAL AND WORKMANSHIP WARRANTY

A Meritor Axle two (2) year limited warranty shall be provided.

30. THREE (3) YEAR ABS BRAKE SYSTEM MATERIAL AND WORKMANSHIP WARRANTY

A Meritor Wabco ABS brake system three (3) year limited warranty shall be provided.

31. FIVE (5) YEAR ENGINE WARRANTY

A Detroit Diesel five (5) year limited engine warranty shall be provided. A copy of the warranty certificate shall be submitted with the bid package.

32. FIVE (5) YEAR TRANSMISSION WARRANTY

The transmission shall have a five (5) year/unlimited mileage warranty covering 100 percent parts and labor. The warranty is to be provided by Allison Transmission and not the apparatus builder.

33. FIVE (5) YEAR TRANSMISSION COOLER WARRANTY

The transmission cooler shall carry a five (5) year parts and labor warranty (exclusive to the transmission cooler). In addition, a collateral damage warranty shall also be in effect for the first three (3) years of the warranty coverage and shall not exceed $10,000 per occurrence. A copy of the warranty certificate shall be submitted with the bid package.

34. TEN (10) YEAR CAB STRUCTURAL INTEGRITY WARRANTY

The new cab shall be provided with a ten (10) year material and workmanship limited warranty. The warranty shall cover such portions of the cab built by the manufacturer as being free from structural failures caused by defects in material and workmanship that would arise under normal use and service.

A copy of the warranty certificate shall be submitted with the bid package.

35. FIVE (5) YEAR ELECTRONIC MODULES AND DISPLAYS MATERIAL AND WORKMANSHIP WARRANTY

The electronic modules and display(s) shall be provided with a five (5) year material and workmanship limited warranty. The warranty shall cover electronic modules to be free from failures caused by defects in material and workmanship.

A copy of the warranty certificate shall be submitted with the bid package.

36. TEN (10) YEAR BODY STRUCTURAL INTEGRITY WARRANTY

Each new piece of apparatus shall be provided with a ten (10) year material and workmanship limited warranty on the apparatus body. The warranty shall cover such portions of the apparatus built by the manufacturer as being free from defects in material and workmanship that would arise under normal use and service.

A copy of the warranty certificate shall be submitted with the bid package.

37. FOUR (4) YEAR CAMERA SYSTEM WARRANTY

A minimum four (4) year warranty shall be provided for the camera system**.**

38. TEN (10) YEAR COMPARTMENT LIGHT WARRANTY

A ten (10) year material and workmanship limited warranty shall be provided for the 12 volt DC LED strip lights**.** The warranty shall cover the LED strip lights to be free from defects in material and workmanship that would arise under normal use. A copy of the warranty certificate shall be submitted with the bid package.

39. LIFETIME WATER TANK WARRANTY

The poly water tank shall be provided with a lifetime material and workmanship limited warranty.

A copy of the warranty certificate shall be submitted with the bid package.

40. TEN (10) YEAR ROLL UP DOOR MATERIAL AND WORKMANSHIP WARRANTY

An Amdor roll-up door limited warranty shall be provided. The roll-up door shall be warranted against manufacturing defects for a period of ten (10) years. In addition to the ten (10) year manufacturing defect warranty, a five (5) year limited warranty shall be provided on all painted surfaces of roll up doors.

A copy of the warranty certificate shall be submitted with the bid package.

41. SIX (6) YEAR PUMP MATERIAL AND WORKMANSHIP WARRANTY

The pump and its components shall be provided with a six (6) year material and workmanship limited warranty. The manufacturer's warranty shall provide that the pump and its components shall be free from failures caused by defects in material and workmanship that would arise under normal use and service.

A copy of the warranty certificate shall be submitted with the bid package.

42. TEN (10) YEAR PUMP PLUMBING WARRANTY

The stainless steel plumbing components and ancillary brass fittings used in the construction of the water/foam plumbing system shall be warranted for a period of ten (10) years or 100,000 miles. This shall cover structural failures caused by defective design or workmanship, or perforation caused by corrosion, provided the apparatus is used in a normal and reasonable manner. This warranty shall apply for a period of ten years from the date of delivery.

A copy of the warranty certificate shall be submitted with the bid package.

43. TWO (2) YEAR GENERATOR MATERIAL AND WORKMANSHIP WARRANTY

A Harrison Hydra-Gen generator two (2) year limited warranty shall be provided.

44. TEN (10) YEAR CAB PAINT AND CORROSION WARRANTY, NON PRO-RATED

The vehicle shall be provided with a ten (10) year paint and corrosion limited warranty on the apparatus cab. The warranty shall cover painted exterior surfaces of the body to be free from blistering, peeling, corrosion, or any other adhesion defect caused by defective manufacturing methods or paint material selection that would arise under normal use and service.

A copy of the warranty certificate shall be submitted with the bid package.

45. TWELVE (12) YEAR BODY PAINT AND CORROSION WARRANTY, NON PRO-RATED

The vehicle shall be provided with a twelve (12) year paint and corrosion limited warranty on the apparatus body. The warranty shall cover painted exterior surfaces of the body to be free from blistering, peeling, corrosion, or any other adhesion defect caused by defective manufacturing methods or paint material selection that would arise under normal use and service.

A copy of the warranty certificate shall be submitted with the bid package.

46. THREE (3) YEAR STRIPING AND LETTERING MATERIAL AND WORKMANSHIP WARRANTY

The gold leaf lamination and Scotchlite shall be provided with a three (3) year material and workmanship limited warranty. The warranty shall cover the gold leaf lamination and Scotchlite as being free from defects in material and workmanship that would arise under normal use and service.

A copy of the warranty certificate shall be submitted with the bid package.

47. ONE (1) YEAR EXHAUST SYSTEM TREATMENT DEVICE MATERIAL AND WORKMANSHIP WARRANTY

The Ward Diesel No-Smoke 2 system shall be provided with a one (1) year manufacturer’s warranty from the date of delivery.

CERTIFICATIONS

The certifications listed below shall be furnished with the bid.

48. VEHICLE STABILITY CERTIFICATION

The fire apparatus manufacturer shall provide a certification stating the apparatus complies with NFPA 1901-4.13, Vehicle Stability. The certification shall be provided at the time of bid.

49. ENGINE INSTALLATION CERTIFICATION

The fire apparatus manufacturer shall provide a certification, along with a letter from the engine manufacturer stating they approve of the engine installation in the bidder's chassis. The certification shall be provided at the time of bid.

50. POWER STEERING CERTIFICATION

The fire apparatus manufacturer shall provide a certification stating the power steering system as installed meets the requirements of the component supplier. The certification shall be provided at the time of bid.

51. CAB INTEGRITY CERTIFICATION

The certification must state that the cab must meet or exceed the requirements below:

- European Occupant Protection Standard ECE Regulation No.29.
- SAE J2422 Cab Roof Strength Evaluation - Quasi-Static Loading Heavy Trucks.
- SAE J2420 Frontal Strength Evaluation - Dynamic Loading Heavy Trucks.
- Roof Crush
    - The cab shall be subjected to a roof crush force of 22,050 lbs. This value meets the ECE 29 criteria and is equivalent to the front axle rating up to a maximum of 10 metric tons.
- Additional Roof Crush
    - The same cab shall be subjected to a roof crush force of 100,000 lbs.
- Side Impact
    - The same cab shall be subjected to dynamic preload where a 13,275 lb. moving barrier slams into the side of the cab at 5.5 mph at a force of 13,000 ft.-lbs. This test is part of the SAE J2422 test procedure and more closely represents the forces a cab would see in a rollover incident.
- Frontal Impact
    - The same cab shall withstand a frontal impact of 32,600 ft-lbs of force using a moving barrier in accordance with SAE J2420.
- Additional Frontal Impact
    - The same cab shall withstand a frontal impact of 65,200 ft-lbs of force using a moving barrier, (twice the force required by SAE J2420).

The same cab shall withstand all tests without any measurable intrusion into the survival space of the occupant area.

There shall be no exception to the cab integrity certification. Nonconformance may lead to rejection of bid.

The certification shall be available at the time of delivery.

52. WINDSHIELD WIPER DURABILITY CERTIFICATION

Windshield wipers shall survive a 3 million cycle durability test in accordance with section 6.2 of SAE J198 *Windshield Wiper Systems - Trucks, Buses and Multipurpose Vehicles.* The bidder shall certify at the time of the bid that the wiper system design has been tested and that the wiper system has met these criteria.

53. SEAT BELT ANCHOR STRENGTH CERTIFICATION

Seat belt attachment strength is regulated by Federal Motor Vehicle Safety Standards and should be validated through testing. Each seat belt anchor design shall withstand 3000 lb. of pull on both the lap and shoulder belt in accordance with FMVSS 571.210 Seat Belt Assembly Anchorages. The bidder shall certify at the time of the bid that each anchor design was pull tested to the required force and met the appropriate criteria.

54. SEAT MOUNTING STRENGTH CERTIFICATION

Seat attachment strength is regulated by Federal Motor Vehicle Safety Standards and should be validated through testing. Each seat mounting design shall be tested to withstand 20 G's of force in accordance with FMVSS 571.207 Seating Systems. The bidder shall certify at the time of the bid that each seat mount and cab structure design was pull tested to the required force and met the appropriate criteria.

55. CAB DEFROSTER CERTIFICATION

Visibility during inclement weather is essential to safe apparatus performance. The defroster system shall clear the required windshield zones in accordance with SAE J381 Windshield Defrosting Systems Test Procedure and Performance Requirements - Trucks, Buses, and Multipurpose Vehicles. The bidder shall certify at the time of the bid that the defrost system design has been tested in a cold chamber and passes the SAE J381 criteria.

56. CAB HEATER CERTIFICATION

Good cab heat performance and regulation provides a more effective working environment for personnel, whether in-transit, or at a scene. The cab heaters shall warm the cab 75 F from a cold-soak, within 30 minutes when tested using the coolant supply methods found in SAE J381. The bidder shall certify at the time of the bid that a substantially similar cab has been tested and has met these criteria.

57. CAB AIR CONDITIONING PERFORMANCE CERTIFICATION

Good cab air conditioning temperature and air flow performance keeps occupants comfortable, reduces humidity, and provides a climate for recuperation while at the scene. The cab air conditioning system shall cool the cab from a heat-soaked condition at 100 degrees Fahrenheit to an average of 67 degrees Fahrenheit in 30 minutes. The bidder shall certify at the time of the bid that a substantially similar air conditioning system has been tested and has met these criteria.

58. AMP DRAW REPORT

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

The manufacturer of the apparatus shall provide the following:

- Documentation of the electrical system performance tests.
- A written load analysis, which shall include the following:
    - The nameplate rating of the alternator.
    - The alternator rating under the conditions specified per applicable NFPA 1901 requirements.
    - The minimum continuous load of each component that is specified per NFPA 1901 requirements.
    - Additional loads that, when added to the minimum continuous load, determine the total connected load.
    - Each individual intermittent load.

MANUALS AND DIAGRAMS

59. FIRE APPARATUS PARTS CD MANUAL

There shall be two (2) custom parts manuals for the complete fire apparatus provided in CD format with the completed unit.

The manuals shall contain the following:

- Job number
- Table of contents
- Instructions on how to locate parts
- Part numbers with full descriptions
- Parts section sorted in functional groups reflecting a major system, component, or assembly
- Parts section sorted in alphabetical order

The manuals shall be specifically written for the chassis and body model being purchased. It shall not be a generic manual for a multitude of different chassis and bodies.

60. CHASSIS SERVICE CD MANUALS

There shall be two (2) CD format chassis service manuals containing parts and service information on major components provided with the completed unit.

The manual shall contain the following sections:

- Job number
- Table of contents
- Troubleshooting
- Front Axle/Suspension
- Brakes
- Engine
- Tires
- Wheels
- Cab
- Electrical, DC
- Air Systems
- Plumbing
- Appendix

The manual shall be specifically written for the chassis model being purchased. It shall not be a generic manual for a multitude of different chassis and bodies.

61. CHASSIS OPERATION CD MANUALS

There shall be two (2) CD format chassis operation manuals provided.

62. ELECTRICAL WIRING DIAGRAMS

Two (2) electrical wiring diagrams, prepared for the specific chassis and body, shall be provided. Diagrams may be paper or electronic (CD format).

63. PUMP MANUALS

Two (2) pump manuals from the pump manufacturer shall be furnished in CD format with the apparatus. Manuals shall cover pump operation, maintenance, overhaul, and parts.

TRAINING

64. TRAINING

A qualified training engineer shall be provided by the bidder. The training engineer shall instruct the Fire Department personnel in the operation and maintenance of the vehicle; chassis, pump, and foam system operation, and operation of the various installed subsystems.

Training shall be provided for each of the four duty shifts, during their regularly scheduled work hours. The four shifts each work on a 24-hour, 0700-0700 schedule on an eight-day rotation (A,D,A,B,C,B,C,D). The trainer should expect to have up to six members per training event.

This training shall not be concurrent with final preparations for delivery and acceptance of the vehicle. Training shall be separate from any final adjustments or similar actions at its destination.

The training curriculum, trainer qualifications, and expected training duration shall be submitted to the Chief of T.F. Green Airport Fire-Rescue for approval prior to the delivery of the vehicle.

Each training session shall include specific training on the operation of the foam system. The training shall include, at a minimum:

- Review of the foam system manual, highlighting key areas.
- A walk around review of the system components, on the finished truck.
- A hands on foam system start-up and foam discharge session, in both stationary and pump-and-roll modes.
- Use of foam through the bumper turret.
- Instructions on the use of the manual overrides.
- Proper shut down and flushing operations.

65. SAFETY VIDEO

As video is much more effective than written documentation and can be replayed for new personnel and as a refresher for existing personnel, an apparatus safety video, in DVD format, shall be provided at time of delivery. This video shall address key safety considerations for personnel to follow when they are driving, operating, and maintaining the apparatus. Safety procedures for the following shall be included on the video: vehicle pre-trip inspection, chassis operation, pump operation, and maintenance.

VEHICLE STRUCTURE AND DRIVE TRAIN

66. CHASSIS

The chassis provided shall be a new, tilt-type custom fire apparatus. The chassis shall be manufactured in the apparatus body builder's facility, eliminating any split responsibility. The chassis shall be designed and manufactured for heavy-duty service, with adequate strength and capacity for the intended load to be sustained and the type of service required.

67. DIMENSIONS

The wheelbase of the vehicle shall be no greater than 217.50 inches.

The total length of the vehicle shall not exceed 432 inches (36 feet, 0 inches).

The total width of the vehicle, excluding the mirrors, shall not exceed 101 inches (8 feet, 5 inches).

The total height of the vehicle shall not exceed 138 inches (11 feet, 6 inches).

68. GVW RATING

The gross vehicle weight rating shall be a minimum of 53,800 pounds.

69. REMOVABLE COMPONENTS

Any component on the exterior of the vehicle, such as pins, covers, caps, or similar components that can conceivably drop to the ground and be left behind inadvertently shall be provided with a retaining cable, strap, or chain connected to the truck to prevent inadvertent loss.

70. FRAME

The chassis frame shall be built with two (2) steel channels bolted to a minimum of five (5) cross members, depending on other options of the apparatus. The side rails shall have a 13.38" tall web over the front and mid sections of the chassis, with a continuous smooth taper to 10.75" over the rear axle. Each rail shall have a section modulus of 25.992 cubic inches and a resisting bending moment (rbm) of at least 3,000,000 in-lb. over the critical regions of the frame assembly, with a section modulus of at least 18.75 cubic inches with an rbm of at least 2,250,000 in-lb. over the rear axle. The frame rails shall be constructed of minimum 120,000 psi yield strength heat-treated 0.38" thick steel with 3.50" wide flanges.

71. FRAME REINFORCEMENT

In addition, a mainframe inverted "L" liner shall be provided. It shall be heat-treated steel measuring 12.00" x 3.00" x 0.25". Each liner shall have a section modulus of at least 7.750 cubic inches, yield strength of at least 110,000 psi, and rbm of at least 850,000 in-lb. Total rbm at wheelbase center shall be at least 3,900,000 in-lb.

The frame liner shall be mounted inside of the chassis frame rail and extend the full length of the frame.

72. GALVANIZED CHASSIS FRAME ASSEMBLY

The chassis frame assembly shall be hot dip galvanized before the installation of the cab and body, and before installation of the engine and transmission assembly, air brake lines, electrical wire harnesses, etc. Components that shall be included with the chassis frame assembly that shall be hot dip galvanized are:

- Frame rails
- Frame liners
- Cross members
- Front frame extension
- Battery boxes

All galvanized components shall be inspected for compliance with ASTM specifications.

73. FRONT NON DRIVE AXLE

The front axle shall be of the independent suspension design with a ground rating of 22,800 lb.

Upper and lower control arms shall be used on each side of the axle. Upper control arm castings shall be made of 100,000-psi yield strength 8630 steel and the lower control arm casting shall be made of 55,000-psi yield ductile iron.

The center cross members and side plates shall be constructed out of 80,000-psi yield strength steel.

Each control arm shall be mounted to the center section using elastomeric bushings. These rubber bushings shall rotate on low friction plain bearings and be lubricated for life. Each bushing shall also have a flange end to absorb longitudinal impact loads, reducing noise and vibrations.

There shall be nine (9) grease fittings supplied, one (1) on each control arm pivot and one (1) on the steering gear extension. The grease fittings shall be connected to the automatic chassis lubrication system.

The upper control arm shall be shorter than the lower arm so that wheel end geometry provides positive camber when deflected below rated load and negative camber above rated load.

Camber at load shall be zero degrees for optimum tire life.

The ball joint bearing shall be of low friction design and be maintenance free.

Toe links that are adjustable for alignment of the wheel to the center of the chassis shall be provided.

The wheel ends must have little to no bump steer when the chassis encounters a hole or obstacle.

The steering linkage shall provide proper steering angles for the inside and outside wheel, based on the vehicle wheelbase.

The axle shall have a third party certified turning angle of 45 degrees. Front discharges and associated plumbing or wheel style shall not infringe on this cramp angle.

74. FRONT SUSPENSION

Front independent suspension shall be provided with a minimum ground rating of 22,800 lb.

The independent suspension system shall be designed to provide maximum ride comfort. The design shall allow the vehicle to travel at highway speeds over improved road surfaces and at moderate speeds over rough terrain with minimal transfer of road shock and vibration to the vehicle's crew compartment.

Each wheel shall have torsion bar type spring. In addition, each front wheel end shall also have energy absorbing jounce bumpers to prevent bottoming of the suspension.

The suspension design shall be such that there is at least 10.00" of total wheel travel and a minimum of 3.75" before suspension bottoms.

The torsion bar anchor lock system allows for simple lean adjustments, without the use of shims. Lean adjustment shall be within 15 minutes per side. Anchor adjustment shall be of a design such that it allows for ride height adjustment on each side.

75. FRONT SHOCK ABSORBERS

KONI heavy-duty telescoping shock absorbers shall be provided on the front suspension.

76. FRONT OIL SEALS

Oil seals with viewing window shall be provided on the front axle.

77. FRONT TIRES

Front tires shall be Goodyear 425/65R22.50 radials, 20 ply G296 MSA tread, rated for 22,800 lb. maximum axle load and 68 mph maximum speed.

The tires shall be mounted on 22.50" x 12.25" steel disc type wheels with a ten (10)-stud, 11.25" bolt circle.

78. REAR AXLE

The rear axle shall be a Meritor model RS-30-185, with a capacity of 31,000 lb.

79. TOP SPEED OF VEHICLE

A rear axle ratio shall be furnished to allow the vehicle to reach a top speed of 60 mph.

80. REAR SUSPENSION

The rear suspension shall be Standens, semi-elliptical, 3.00" wide x 53.00" long, 12-leaf pack with a ground rating of 31,000 lbs. The spring hangers shall be castings, not weldments or fabrications.

The two (2) top leaves shall wrap the forward spring hanger pin, and the rear of the spring shall be a slipper style end that shall ride in a rear slipper hanger. To reduce bending stress due to acceleration and braking, the front eye shall be a Berlin eye that shall place the front spring pin in the horizontal plane within the main leaf.

A steel encased rubber bushing shall be used in the spring eye. The steel encased rubber bushing shall be maintenance free and require no lubrication.

81. REAR OIL SEALS

Oil seals shall be provided on the rear axle.

82. REAR TIRES

Rear tires shall be four (4) Goodyear 315/80R22.50 radials, 18 ply "all season" Regional RHD II HCT tread, rated for 31,620 lb. maximum axle load and 75 mph maximum speed.

The tires shall be mounted on 22.50" x 9.00" steel disc type wheels with a ten (10) stud, 11.25" bolt circle.

83. TIRE BALANCE

All tires shall be balanced with Counteract balancing beads. The beads shall be inserted into the tire and eliminate the need for wheel weights.

84. TIRE PRESSURE MANAGEMENT

Tire pressure monitoring shall be integrated with the vehicle’s electronic information display system. Each tire shall independently communicate with the electronic display, which will provide a colored display reading of the current tire pressure and temperature status. Digital indication of tire pressure is preferred; however a binary “good/low” style readout is acceptable. An alarm at the electronic display shall indicate low tire pressures. The tire pressure management system shall be able to be recalibrated if wheels are moved to a different position on the vehicle.

85. CHROME LUG NUT COVERS

Chrome lug nut covers shall be supplied on front and rear wheels.

86. MUD FLAPS - FRONT

Mud flaps shall be installed behind the front wheels of the apparatus.

87. MUD FLAPS - REAR

Mud flaps shall be installed ahead of and behind the rear wheels on the apparatus.

88. WHEEL CHOCKS

There shall be one (1) pair of folding Ziamatic, Model SAC-44-E, aluminum alloy, Quick-Choc wheel blocks with easy-grip handle provided.

89. WHEEL CHOCK BRACKETS

There shall be one (1) pair of Ziamatic, Model SQCH-44-H, horizontal mounting wheel chock brackets provided for the Ziamatic, Model SAC-44-E, folding wheel chocks. The brackets shall be made of aluminum and consist of a quick release spring loaded rod to hold the wheel chocks in place. The brackets shall be mounted inside the left side compartment in front of the left side rear tire. Specific location shall be determined during the preconstruction conference. In no circumstances shall the chocks be mounted outside of the vehicle.

90. ELECTRONIC STABILITY CONTROL

A vehicle control system shall be provided as an integral part of the ABS brake system from Meritor Wabco.

The system shall monitor and update the lateral acceleration (cornering) of the vehicle and compare it to a critical threshold where a side roll event may occur. If the critical threshold is met, the vehicle control system shall automatically reduce engine RPM, engage the engine retarder (if equipped), and selectively apply brakes to the individual wheel ends of the front and rear axles to reduce the possibility of a side roll event.

The system shall monitor directional stability through an electronic lateral accelerometer, steer angle sensor and yaw rate sensor. If spinout or drift out is detected, the vehicle control system shall selectively apply brakes to the individual wheel ends of the front and rear axles to assist in bringing the vehicle back to its intended direction. The operator shall continue to provide steering input in the desired direction as the system compensates.

It is understood that Electronic Stability Control is not a guarantee that a side roll event, spinout, or drift out will not occur.

91. ANTI-LOCK BRAKE SYSTEM

The vehicle shall be equipped with a Wabco 4S4M, anti-lock braking system. The ABS shall provide a four (4) channel anti-lock braking control on both the front and rear wheels. A digitally controlled system that utilizes microprocessor technology shall control the anti-lock braking system. Each wheel shall be monitored by the system. When any wheel begins to lockup, a signal shall be sent to the control unit. This control unit shall then reduce the braking of that wheel for a fraction of a second and then reapply the brake. This anti-lock brake system shall eliminate the lockup of any wheel thus helping to prevent the apparatus from skidding out of control.

92. AUTOMATIC TRACTION CONTROL

An anti-slip feature shall be included with the ABS. The Automatic Traction Control shall be used for traction in poor road and weather conditions. The Automatic Traction Control shall act as an electronic differential lock that shall not allow a driving wheel to spin, thereby supplying traction at all times. The ABS electronic control unit (ECU) shall work with the engine ECU, sharing information concerning wheel slip. Engine ECU shall use information to control engine speed, allowing only as much throttle application as required for the available traction, regardless of how much the driver is asking for. A "mud/snow" switch shall be provided on the instrument panel. Activation of the switch shall allow additional tire slip to let the truck climb out and get on top of deep snow or mud.

93. BRAKES

The service brake system shall be full air type.

The front brakes shall be Knorr/Bendix disc type with a 17.00" ventilated rotor for improved stopping distance.

The brake system shall be certified, third party inspected, for improved stopping distance. The rear brakes shall be Meritor 16.50" x 8.63" cam operated with automatic slack adjusters.

94. AIR COMPRESSOR, BRAKE SYSTEM

The air compressor shall be a Bendix, Model BA-921, with 15.80 cubic feet per minute output at 1,250 rpm.

95. BRAKE SYSTEM

The brake system shall include:

- Bendix dual brake treadle valve with vinyl covered foot surface
- Heated automatic moisture ejector on air dryer
- Total air system capacity of 5,198 cubic inches
- Two (2) air pressure gauges with a red warning light and an audible alarm, that activates when air pressure falls below 60 psi
- Spring set parking brake system
- Parking brake operated by a push-pull style control valve at the driver’s position
- A parking "brake on" indicator light on instrument panel
- Parking brake relay/inversion and anti-compounding valve, in conjunction with a double check valve system, with an automatic spring brake application at 40 psi
- A pressure protection valve to prevent all air operated accessories from drawing air from the air system when the system pressure drops below 80 psi (550 kPa)

The air tank shall be primed and painted to meet a minimum 750 hour salt spray test.

To reduce the effects of corrosion, the air tank shall be mounted with stainless steel brackets.

96. BRAKE SYSTEM AIR DRYER

The air dryer shall be a WABCO System Saver 1200 Plus with spin-on coalescing filter cartridge and 100 watt heater.

97. BRAKE LINES

Color-coded nylon brake lines shall be provided. The lines shall be wrapped in a heat protective loom where necessary in the chassis.

98. AIR INLET

One (1) air inlet with male coupling shall be provided. It shall allow station air to be supplied to the apparatus brake system through a shoreline hose. The inlet shall be located in the driver side lower step well of cab. A check valve shall be provided to prevent reverse flow of air. The inlet shall discharge into the "wet" tank of the brake system. A mating female coupling shall also be provided with the loose equipment.

An auto eject fitting is not required for this coupling.

99. ADDITIONAL PARKING BRAKE CONTROL

A second parking brake control valve shall be installed on the officer side of the instrument panel. This valve shall only activate the brakes if manually pulled out; low air pressure shall not activate this valve.

100. U-BOLT GUARD OVER PARKING BRAKE KNOB

There shall be a U-bolt type protective guard installed over each "Parking Brake" knob to prevent accidental activation of the brake. The guards shall be located on the driver's and passenger's side knobs.

101. ENGINE

The chassis shall be powered by an electronically controlled engine as described below:

- Make: Detroit Diesel
- Model: DD13
- Power: 450 hp at 1800 rpm
- Torque: 1550 lb-ft at 1200 rpm
- Governed Speed: 2080 rpm
- Emissions Level: EPA 2013
- Fuel: Diesel
- Cylinders: Six (6)
- Displacement: 781 cubic inches (12.8L)
- Starter: Delco 39MT
- Fuel Filters: Dual cartridge style with check valve, water separator, and water in fuel sensor
- Coolant Filter: Cartridge style with shut off valves on the supply and return line

The engine shall include On-Board Diagnostics (OBD), which provides self-diagnostic and reporting. The system shall give the operator or repair technician access to state of health information for various vehicle sub systems. The system shall monitor vehicle systems, engine and after treatment. The system shall illuminate a malfunction indicator light on the dash console if a problem is detected.

The engine OBD shall communicate with the vehicle electronic information system, and shall report engine faults in plain language, without the need to cross reference fault codes.

102. REAR ENGINE POWER TAKE OFF DRIVE

A rear engine power take off (REPTO) shall be provided to drive the water pump. A vibration dampener shall be provided between the REPTO and water pump. Transmission PTOs used to drive the water pump shall not be allowed due to their lower torque ratings. The rear engine PTO shall allow for continuous 240 hp and 480 lb-ft torque ratings needed for large pump applications. The rear engine power take off shall have the same warranty as the engine provided by the engine manufacturer.

The REPTO drive shall also allow the pump to turn in the correct direction when the vehicle transmission is in forward, reverse, or neutral.

103. HIGH IDLE

A high idle switch shall be provided, inside the cab, on the instrument panel, that shall automatically maintain a preset engine rpm. A switch shall be installed, at the cab instrument panel, for activation/deactivation.

The high idle shall be operational only when the parking brake is on and the truck transmission is in neutral. A green indicator light shall be provided, adjacent to the switch. The light shall illuminate when the above conditions are met. The light shall be labeled "OK to Engage High Idle."

High idle shall automatically turn off when the parking brake is released, or the transmission is shifted out of “Neutral.”

104. ENGINE BRAKE

A Jacobs engine brake is to be installed with the controls located on the instrument panel within easy reach of the driver.

The driver shall be able to turn the engine brake system on and off and have a high, medium and low setting.

The engine brake shall be installed in such a manner that when the engine brake is slowing the vehicle the brake lights are activated.

The ABS system shall automatically disengage the auxiliary braking device when required.

105. CLUTCH FAN

A Horton fan clutch shall be provided. The fan clutch shall be automatic when the pump transmission is in "Road" position, and fully engaged in "Pump" position.

106. ENGINE AIR INTAKE

An air intake with an ember separator (to prevent road dirt, burning embers, and recirculating hot air from entering the engine) shall be mounted at the front of the apparatus. The ember separator shall be mounted in the air intake with flame retardant, roto-molded polyethylene housing. It shall be easily accessible by the hinged access panel at the front of the vehicle.

107. EXHAUST SYSTEM

The exhaust system shall be stainless steel from the turbo to the inlet of the selective catalytic reduction (SCR) device, and shall be 5.00" in diameter. The exhaust system shall include a diesel particulate filter (DPF) and an SCR device to meet current EPA standards. An insulation wrap shall be provided on all exhaust pipes between the turbo and SCR to minimize the transfer of heat to the cab.

The exhaust pipe shall discharge 90 degrees to the body, beneath the body.

A Ward Diesel No Smoke 2 exhaust After Treatment Device shall be installed after the DPF and SCR systems in the exhaust system. The system shall include an indicator lamp at the driver’s seating position to indicate exhaust back pressures exceeding 1.5 psi.

There shall be a minimum of 2.50" from the exhaust pipe tip to the underside of the body heat shield. The last 7.00" of the exhaust shall be free of hangers and/or clamps.

108. RADIATOR

The radiator and the complete cooling system shall meet or exceed NFPA and engine manufacturer cooling system standards.

For maximum corrosion resistance and cooling performance, the entire radiator core shall be constructed using long life aluminum alloy. The core shall be made of aluminum fins, having a serpentine design, brazed to aluminum tubes. The tubes shall be brazed to aluminum headers. No solder joints or leaded material of any kind shall be acceptable in the core assembly. The radiator core shall have a minimum frontal area of 1434 square inches. Supply and return tanks made of glass-reinforced nylon shall be crimped on to the core assembly using header tabs and a compression gasket to complete the radiator core assembly. The radiator shall be compatible with commercial antifreeze solutions.

There shall be a full steel frame around the entire radiator core assembly. The radiator core assembly shall be isolated within the steel frame by rubber inserts to enhance cooling system durability and reliability. The radiator shall be mounted in such a manner as to prevent the development of leaks caused by twisting or straining when the apparatus operates over uneven ground. The radiator assembly shall be isolated from the chassis frame rails with rubber isolators.

The radiator assembly shall include an integral deaerating tank permanently mounted to the top of the radiator framework, with a readily accessible remote-mounted overflow tank. For visual coolant level inspection, the radiator shall have a built-in sight glass. If the sight glass is not readily visible during daily inspections, a remote indicator of radiator fluid level shall be provided. The radiator shall be equipped with a 15 psi pressure relief cap.

A drain port shall be located at the lowest point of the cooling system and/or the bottom of the radiator to permit complete flushing of the coolant from the system.

A heavy-duty fan shall draw in fresh, cool air through the radiator. Shields or baffles shall be provided to prevent recirculation of hot air to the inlet side of the radiator.

109. COOLANT LINES

Silicone hoses shall be used for all engine/heater coolant lines installed by the chassis manufacturer.

Hose clamps shall be stainless steel constant torque type to prevent coolant leakage. They shall react to temperature changes in the cooling system and expand or contract accordingly while maintaining a constant clamping pressure on the hose.

110. FUEL TANK

A minimum 65 gallon fuel tank shall be provided and mounted at the rear of the chassis. The tank shall be constructed of 12-gauge, hot rolled steel. It shall be equipped with swash partitions and a vent. To eliminate the effects of corrosion, the fuel tank shall be mounted with stainless steel straps.

A 0.75" drain plug shall be provided in a low point of the tank for drainage.

A fill inlet shall be located on the left hand side of the body and be covered with a hinged, spring loaded, stainless steel door, painted the same color as the truck’s body, that is marked "Ultra Low Sulfur - Diesel Fuel Only." The fill inlet shall be tilted inwards and downwards towards the truck, at least 45 degrees from vertical. The inner diameter of the fill inlet shall be capable of accepting an OPW 7H “High flow” diesel nozzle.

A 0.50" diameter vent shall be provided running from top of the tank to just below the fuel fill inlet.

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

All fuel lines shall be provided as recommended by the engine manufacturer.

To allow the engine to be restarted after running out of fuel, a means of priming the fuel system from the driver’s seated position shall be provided.

111. DIESEL EXHAUST FLUID TANK

A 4.5 gallon diesel exhaust fluid (DEF) tank shall be provided and mounted in the driver's side body forward of the rear axle. A 0.50" drain plug shall be provided in a low point of the tank for drainage.

A fill inlet shall be located on the driver's side of the body and be covered with a hinged, spring loaded, stainless steel door, painted the same color as the truck’s body, that is marked "Diesel Exhaust Fluid Only".

The tank shall meet the engine manufacturer’s requirement for 10 percent expansion space in the event of tank freezing.

The tank shall include an integrated heater unit that utilizes engine coolant to heat the DEF in the event of freezing temperatures.

112. FUEL SHUTOFF

A shutoff valve shall be installed in the fuel line, at the fuel tank.

113. FUEL COOLER

An air to fuel cooler shall be installed in the engine fuel return line.

114. TRANSMISSION

An Allison 5th generation, model EVS 4000P, electronic, torque converting, automatic transmission shall be provided.

The transmission shall be equipped with prognostics to monitor oil life, filter life, and transmission health. A wrench icon on the shift selector's digital display shall indicate when service is due. The transmission electronics shall also report to the vehicle’s electronic information system, which shall display such transmission data.

Two (2) PTO openings shall be located on left side and top of the converter housing (positions 8 o'clock and 1 o'clock).

A transmission temperature gauge with overheat indicating red light and buzzer shall be installed on the cab instrument panel.

115. TRANSMISSION SHIFTER

A five (5)-speed push button shift module shall be mounted to right of the driver on the console. Shift position indicator shall be indirectly lit for after dark operation.

The transmission gear ratios shall be:

1st	3.51 to 1.00
2nd	1.91 to 1.00
3rd	1.43 to 1.00
4th	1.00 to 1.00
5th	0.74 to 1.00
R	4.80 o 1.00

116. TRANSMISSION PROGRAMMING

The transmission shall be programmed to automatically shift the transmission to neutral when either parking brake actuator is set to simplify operation and increase operational safety.

The transmission shall also be programmed to not “up shift” into second or any higher forward gear when Pump and Roll is engaged to prevent the increased engine speed from accelerating the vehicle inadvertently and without operator control.

117. TRANSMISSION COOLER

A Modine plate and fin transmission oil cooler shall be provided using engine coolant to control the transmission oil temperature.

118. DRIVELINE

Drivelines shall be a heavy-duty metal tube and be equipped with Spicer 1810 universal joints.

The shafts shall be dynamically balanced before installation.

A splined slip joint shall be provided in each driveshaft. The slip joint shall be coated with Glidecoat or equivalent lubricant.

119. STEERING

Dual Sheppard, Model M110, steering gears, with integral heavy-duty power steering, shall be provided. For reduced system temperatures, the power steering shall incorporate an air to oil cooler and an Eaton Model VN20F hydraulic pump with integral pressure and flow control. All power steering lines shall have wire braided lines with crimped fittings.

A tilt and telescopic steering column shall be provided to improve fit for a broad range of driver configurations.

120. STEERING WHEEL

The steering wheel shall be 18.00" in diameter, have tilting and telescoping capabilities, and a 4-spoke design.

121. AUTOMATIC CHASSIS LUBRICATION

A Vogel Automatic Lubrication System shall be provided. The lubrication shall be supplied while the vehicle ignition switch is active to allow a uniform application of grease to the locations listed. The electronic control unit that forms part of the system shall activate the pump after an adjustable interval time. The unit shall control and monitor pump operation and report any faults via an indicator light on the driver's dashboard of the cab.

The lubrication system reservoir, which requires a 15.00" wide x 14.50" high x 6.25" deep mounting area, shall be mounted in a location to be determined at the Preconstruction Conference.

The following components, at a minimum, shall be lubricated by this system:

- Independent suspension control arm pivot points
- Rear axle slack adjusters
- Rear axle brake cam screws
- Rear suspension spring pins
- Rear suspension shackle pins

122. BUMPER

A one (1) piece bumper manufactured from 0.25" formed steel with a 0.38" bend radius shall be provided. The bumper shall be a minimum of 10.00" high with a 1.50" top and bottom flange, and shall extend 22.00" from the face of the cab. The bumper shall be 102.00" wide with 45 degree corners and side plates. The bumper shall be metal finished and painted the body color.

To provide adequate support strength, the bumper shall be mounted directly to the front of the C channel frame. The frame shall be a bolted modular extension frame constructed of 50,000 psi tensile steel.

Documentation shall be provided, upon request, to show that the options selected have been engineered for fit-up and approval for this modular bumper extension. A chart shall be provided to indicate the option locations and shall include, but not be limited to, the following options: air horns, the mechanical siren, speaker, hose tray (with hose capacities), lights, discharges, and bumper turret.

123. GRAVEL PAN

A gravel pan, constructed of bright of minimum 0.190” aluminum tread plate, shall be furnished between the bumper and the cab face. The pan shall be properly supported from the underside to prevent flexing and vibration.

124. HOSE TRAY

A hose tray, constructed of 0.190” thick minimum, plain-finish aluminum, shall be placed in the center of the bumper extension. The tray may extend 1.50" above the front deck and/or 1.50" below the bumper. The tray shall be constructed to adequately support the hose and nozzle stored in it.

The tray shall have a capacity of 150 feet of 1.75" double-jacket hose, in three 50-foot lengths, with a Task Force Tips Mid-Force nozzle attached. RIAC shall provide the hose and nozzle.

The discharge for the hose tray shall be a chromed 90 degree swivel with a 1.50” male National Standard thread, protruding from the top of the gravel pan adjacent to the hose tray. Discharges that terminate within the hose tray shall not be acceptable.

Black rubber grating shall be provided at the bottom of the tray. Drain holes shall also be provided in the bottom of the tray.

125. HOSE RESTRAINT STRAPS

One (1) pair of 2.00" wide black nylon straps with Velcro fasteners shall be provided to restrain the hose in the bumper hose tray. The straps shall be permanently attached with footman loops and located above the center hose tray.

126. LIFT AND TOW MOUNTS

Two lift and tow mounts shall be mounted to the frame extension behind the front bumper. The lift and tow mounts shall be designed and positioned to adapt to tow truck lift systems.

The lift and tow mounts with eyes shall be painted the same color as the frame.

127. TOW HOOKS

Two (2) chromed steel tow hooks shall be installed under the bumper and attached to the front frame members. The tow hooks shall be designed and positioned to allow up to a 6,000 lb. straight horizontal pull in line with the centerline of the vehicle. The tow hooks shall not be used for lifting of the apparatus.

128. LINE-X COATING - FRONT BUMPER

Protective Line-X coating shall be provided on the outside exterior of the top front bumper flange. It shall not be sprayed on the underside of the flange. The protective coating shall be black in color.

The lining shall be properly installed by an authorized Line-X dealer.

VEHICLE CAB

129. CAB, GENERAL

The cab shall be designed specifically for the fire service and shall be manufactured by the chassis builder.

To provide quality at the source and single source customer support, the cab shall be built by the apparatus manufacturer in a facility located on the manufacturer's premises. Vehicles which have the cab constructed by a third party shall not be acceptable.

For reasons of structural integrity and enhanced occupant protection, the cab shall be of heavy duty design, constructed to the following minimum standards.

The cab shall have 12 main vertical structural members; located in the A-pillar (front cab corner posts), B-pillar (side center posts), C-pillar (rear corner posts) and rear wall areas. The A-pillar shall be constructed of minimum 0.25" heavy wall extrusions joined by a solid A356-T6 aluminum joint casting. The B-pillar and C-pillar shall also be constructed from minimum 0.25" heavy wall extrusions. The rear wall shall be constructed of two (2) 4.00" x 2.00" outer aluminum extrusions and two (2) 3.00" x 2.00" inner aluminum extrusions. All main vertical structural members shall run from the floor to 7.50" x 3.50" x 0.125" thick roof extrusions to provide a cage-like structure with the A-pillar and roof extrusions being welded into a 0.75" thick corner casting at each of the front corners of the roof assembly.

The front of the cab shall be constructed of a minimum 0.25" thick firewall, covered with a 0.125" front skin (for a total thickness of 0.38"), and reinforced with 24.50" wide x 10.00" deep x 0.50" thick supports on each side of the engine tunnel. The cross-cab support shall be welded to the A-pillar, 0.25" firewall, and engine tunnel on the left and right sides.

The cab floors shall be constructed of 0.1875" thick aluminum plate and reinforced at the firewall with an additional 0.25" thick cross-floor support providing a total thickness of 0.44" of structural material at the front floor area. The front floor area shall also be supported with three (3) 0.50" plates bolted together that also provides the mounting point for the cab lift. This tubing shall run from the front of the cab to the 0.1875" thick engine tunnel, creating the structure to support the forces created when lifting the cab.

The cab shall be a full-tilt style. A three (3)-point cab mount system with rubber isolators shall improve ride quality by isolating chassis vibrations from the cab.

The crew cab shall be a totally enclosed design with the interior area completely open to improve visibility and verbal communication between the occupants.

The forward cab section shall have an overall height (from the cab roof to the ground) of approximately 102.00". The crew cab section shall have a 10.00" raised roof, with an overall cab height of approximately 112.00". The raised portion shall start at the most forward point of the B-pillar and continue rearward to the back of the cab. The overall height listed shall be calculated based on a truck configuration with the specified suspension weight ratings, the specified tires, no water weight, no loose

equipment weight, and no personnel weight. It is accepted that larger tires, wheels, and suspension may increase this overall height.

The cab shall have an interior width of not less than 93.50". The driver and passenger seating positions shall have a minimum 24.00" clear width at knee level.

To reduce injuries to occupants in the seated positions, proper head clearance shall be provided. The floor-to-ceiling height inside the forward cab shall be no less than 60.00". The floor-to-ceiling height inside the crew cab shall be no less than 62.00" in the center positions and 68.00" in the outboard position.

The crew cab shall measure a minimum of 57.00" from the rear wall to the backside of the engine tunnel (knee level) for optimal occupant legroom.

A plate that is highly visible to the driver while seated shall be provided that shows the overall height, length, and gross vehicle weight rating of the completed vehicle. Vehicle height shall be calculated with no water, foam, personnel, or equipment on the vehicle.

130. CAB PUMP ENCLOSURE

The rear of the cab shall be made to house the fire pump below the forward facing crew cab seats. The cab side panels shall be notched to accommodate the pump panel.

131. INTERIOR CAB INSULATION

The cab walls, ceiling and engine tunnel shall be insulated in all strategic locations to maximize acoustic absorption and thermal insulation. The cab shall be insulated with 2.00" insulation in the rear wall, 3.00" insulation in the side walls, and 1.50" insulation in the ceiling.

132. FENDER LINERS

Full-circular, aluminum inner fender liners in the wheel wells shall be provided.

133. PANORAMIC WINDSHIELD

A safety glass windshield with at least 2,800 square inches of clear viewing area shall be provided. The windshield shall be full width and shall provide the occupants with a panoramic view. The windshield shall consist of three (3) layers: the outer light, the middle safety laminate, and the inner light. The 0.114" 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. The inner light shall provide another chip resistant layer, and protect the safety laminate layer from damage. The cab windshield shall be bonded to the aluminum windshield frame using a urethane adhesive. A custom frit pattern shall be applied on the outside perimeter of the windshield for a finished automotive appearance.

One-piece windshields without a center mullion are preferred.

134. WINDSHIELD WIPERS

Three (3) electric windshield wipers with a washer, in conformance with FMVSS and SAE requirements, shall be provided. The wiper blades shall together clear a minimum 75 percent of the windshield for maximum visibility in inclement weather. The motor drive units for the wipers shall be accessible through the access hood for maintenance and repair.

The windshield washer fluid reservoir shall be located at the front of the vehicle and be accessible through the access hood for simple maintenance.

135. FAST SERVICE ACCESS FRONT-TILT HOOD

A full-width access hood shall be provided for convenient access to engine coolant, steering fluid, wiper fluid, cab lift controls, headlight power modules, and ember separator. The hood shall also provide complete access to the windshield wiper motor and components. The hood shall be contoured to provide a sleek, automotive appearance. The hood shall be constructed in a manner that provides for structural integrity for the life of the cab under anticipated loads. The hood shall include air cylinders to hold the hood in open and closed positions, and a heavy duty latch system that shall meet FMVSS 113 (Hood Latch System). The spring-loaded hood latch shall be located at the center of the hood with a double-action release lever located behind the upper grille. The two (2)-step release shall require the lever first be pulled to the driver side until the hood releases from the first latch (primary latch) then to the passenger side to fully release the hood (secondary latch).

136. ENGINE TUNNEL

To provide structural strength, the engine tunnel sidewalls shall be constructed of .50" aluminum plate that is welded to both the .25" firewall and .38" heavy wall extrusion under the crew cab floor. To maximize occupant space, the top edges shall be tapered inward towards the center of the cab.

The back of the engine tunnel shall be no higher than 16.25" off the crew cab floor.

The engine tunnel shall be insulated on both sides for thermal and acoustic absorption. The underside of the tunnel shall be covered with 1.00" thick polyether foam that is reinforced with an aluminized face. Thermal rating for this insulation shall be -40 degrees Fahrenheit to 300 degrees Fahrenheit. The insulation shall keep noise (dBA) levels at or lower than the specifications in the current edition of the NFPA 1901 standards.

Cup holders shall be provided on the engine tunnel within reach of seated personnel in the driver and officer’s seats.

137. CAB REAR WALL EXTERIOR COVERING

The exterior surface of the rear wall of the cab shall be overlaid with bright aluminum tread plate except for areas that are not typically visible when the cab is lowered.

138. CAB LIFT

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 hydraulic pump shall have a backup manual override, for use in the event of an electrical failure.

The location of the cab lift control shall be decided at the Preconstruction Conference.

The controls shall include a permanently mounted raise/lower switch. For enhanced visibility during cab tilt operations, a remote control tether with on/off switch shall be supplied on a coiled cord that shall extend from 2.00' (coiled) to 6.00' (extended).

The cab shall be capable of tilting 42 degrees, and 80 degrees with crane assist, to accommodate engine maintenance and removal. The cab pivots shall be located 46.00" apart to provide stability while tilting the cab.

The rear of the cab shall be locked down by a two (2)-point, automatic, hydraulic, double hook mechanism that fully engages after the cab has been lowered (self-locking). The dual 2.25" diameter hydraulic cylinders shall be equipped with a velocity fuse that protects the cab from accidentally descending when the cab is in the tilt position.

For increased safety, a redundant mechanical stay arm shall be provided that must be manually put in place on the driver side between the chassis and cab frame when cab is in the raised position. This device shall be manually stowed to its original position before the cab can be lowered.

If the handle for the manual cab lift pump is not permanently attached to the lift pump, the handle shall be mounted in an accessible location to be determined at the Preconstruction Conference.

139. CAB LIFT INTERLOCK

The cab lift safety system shall be interlocked to the parking brake. The cab tilt mechanism shall be active only when the parking brake is set and the ignition switch is in the on position. If the parking brake is released, the cab tilt mechanism shall be disabled.

140. GRILLE

A bright finished aluminum mesh grille screen, inserted behind a formed bright finished grille surround, shall be provided on the front center of the cab, and shall serve as an air intake to the radiator. A numeral, “4”, as large as practical, shall be painted on the grille in a color and size to be determined at the Preconstruction Conference.

141. DOOR JAMB SCUFF PLATES

All cab door jambs shall be furnished with a polished stainless steel scuff plate, mounted on the striker side of the jamb.

142. FRONT CAB TRIM

Bright finished wrap-around housings shall be provided on each side of the front cab face for mounting of the headlights and front directional lights. The housings shall mate up to the side edge of the forward grille, and then extend around the front corners of the cab rearward, providing for a streamlined automotive appearance.

143. CAB SIDE MOLDING

Chrome molding shall be provided on both sides of cab.

144. MIRRORS

A CVG heated and motorized “Aero style” 7.00” x 16.00” MotoMirror with RoadWatch air and roadway temperature monitoring, model 314065-RWSSNC, shall be appropriately installed on the driver’s door.

A matching CVG heated and motorized “Aero style” 7.00” x 16.00” MotoMirror, model 8-2410, shall be appropriately installed on the passenger’s door.

Both mirrors shall have a remote control to control movement and mirror heat that is mounted convenient to the driver. Marker lights on the mirror are not required.

145. CONVEX MIRRORS

An 8.50" diameter round, heated convex mirror with stainless back and offset stainless hardware, CVG “Prutsman” model RO900, shall be installed below each mirror head. The mirror heat shall be controlled with the primary mirror. Remote control of movement shall not be required.

146. DOORS

The forward cab and crew cab doors shall be half-height "barrier" style doors. To enhance entry and egress to the cab, the forward cab doors shall be a minimum of 43.59" wide x 64.71" high. The crew cab doors shall measure a minimum of 37.87" wide x 73.75" high.

The forward cab and crew cab doors shall be constructed of extruded aluminum with a nominal material thickness of 0.125". The exterior door skins shall be constructed from .090" aluminum.

The forward cab door windows shall include a 7.50" high x 10.00" wide drop area at the front to enhance visibility.

A customized, vertical, pull-down type door handle shall be provided on the exterior of each cab door. The exterior handle shall be designed specifically for the fire service to prevent accidental activation, and shall provide 4.00" wide x 2.00" deep hand clearance for ease of use with heavy gloved hands. Each door shall also be provided with an interior flush, open style paddle handle that shall be readily operable from fore and aft positions, and be designed to prevent accidental activation. The interior handles shall provide 4.00" wide x 1.25" deep hand clearance for ease of use with heavy gloved hands.

Door locks shall not be provided.

A full length, heavy duty, stainless steel, piano-type hinge with a 0.38" pin and 11 gauge leaf shall be provided on all cab doors. There shall be double automotive-type rubber seals around the perimeter of the door framing and door edges to ensure a weather-tight fit.

A fabric web, minimum 5.00” wide, shall be installed at the hinge to prevent the door from opening to the point where damage could occur to the hinge, door, or vehicle cab/body. The web shall be capable of stopping a swinging door in 45 mile per hour winds blowing on the door from the most severe angle. A 1.00” nylon web, red in color, shall be installed vertically on the larger web to facilitate entering the cab and closing the door.

The cab steps at each cab door location shall be located below the cab doors and shall be exposed to the exterior of the cab.

147. DOOR PANELS

The inner cab door panels shall be constructed out of brushed stainless steel. The cab door panels shall be removable without disconnecting door and window mechanisms.

148. RECESSED POCKETS WITH ELASTIC COVERS

To provide organized storage (clutter control) in the cab for miscellaneous equipment, the cab interior shall be provided with recessed storage pockets. The pockets shall be 5.63" wide x 2.00" high x 4.00" deep. The pockets shall be provided with a perforated elastic material cover to secure the equipment in the pocket. The pockets shall be installed in all available mounting locations of the overhead console.

149. ELECTRIC WINDOW CONTROLS

Each cab entry door shall be equipped with an electrically operated tempered glass window. A window control panel shall be located on the door panel within easy reach of the respective occupant. Each switch shall allow intermittent or auto down operation for ease of use. Auto down operation shall be actuated by holding the window down switch for approximately 1/2 second. The driver control panel shall contain a control switch for each cab door's window. All other door control panels shall contain a single switch to operate the window within that door.

The window switches shall be connected directly to the battery power system to allow the windows to be raised and lowered when the battery switch is in the off position.

150. STIRRUP-STYLE CAB STEPS

The forward cab and crew cab access steps shall be a full size two (2) step design to provide largest possible stepping surfaces for safe ingress and egress. The bottom steps shall be designed with a grip pattern punched into bright aluminum tread plate material to provide support, slip resistance, and drainage. The bottom steps shall hang below the underside of the cab to allow an easy first step from the ground, suspended from the left and right side when facing the step. The upper steps shall be recessed into

the cab below the door to provide an equal step height from the ground to the first step, and the second step and into the cab. The second step shall not protrude from the outer edge of the cab. Fold-down or power operated steps shall not be acceptable. Three (3) step entrance designs shall not be acceptable. A slip-resistant knurled aluminum handrail shall be provided on the exterior of the cab adjacent to each cab door opening to assist during cab ingress and egress.

151. STEP LIGHTS

For reduced overall maintenance costs compared to incandescent lighting, there shall be four (4) white LED step lights provided. The lights shall be installed at each cab and crew cab door, one (1) per step. The lights shall be located in the driver side front doorstep, driver side crew cab doorstep, passenger side front doorstep and passenger side crew cab doorstep.

In order to ensure adequate illumination, each light shall provide a minimum of 25 foot-candles (fc) covering an entire 15.00" x 15.00" square placed 10.00" below the light and a minimum of 1.5 fc covering an entire 30.00" x 30.00" square at the same 10.00" distance below the light.

The lights shall be activated when the respective adjacent door is opened.

152. FENDER CROWNS

Black rubber fender crowns shall be installed at the cab wheel openings. These fender crowns shall be attached in a method similar to that described in the Body Fender Crowns section (Section 284).

153. CREW CAB WINDOWS

One (1) fixed window with tinted glass shall be provided on each side of the cab, to the rear of the front cab door. The windows shall be sized to enhance light penetration into the cab interior. The windows shall measure 20.00" wide x 20.50" high. These windows shall not have provisions to open.

No windows shall be provided on the rear wall of the cab.

154. WINDOW INTERIOR TRIM

For improved aesthetics, the cab side windows shall include a vacuum formed ABS interior trim panel.

155. CAB INTERIOR

With safety as the primary objective, the wrap-around style cab instrument panel shall be designed with unobstructed visibility to instrumentation. The dash layout shall provide the driver with a quick reference to gauges that allows more time to focus on the road.

The center console shall be a high impact ABS polymer and shall be easily removable for access to the defroster. The forward area of the center console shall include louvers strategically located for optimal air flow and defrost capability to the maximum possible area of the windshield.

The passenger side dashboard shall be constructed of painted aluminum for durability and low maintenance. For enhanced versatility, the passenger side dash shall include a flat working surface.

To provide optional control panels, switches and storage modules, a painted aluminum overhead console shall also be provided.

To complete the cab front interior design, painted aluminum modesty panels shall be provided under the dash on both sides of the cab. The driver side modesty panel shall provide mounting for the battery switch and diagnostic connectors, while the passenger side modesty panel provides a glove box, and ground access to the main electrical distribution panel via quick quarter turn fasteners.

To provide a deluxe automotive interior, the engine tunnel, side walls and rear wall shall be covered by a leather grain vinyl that is resistant to oil, grease, and mildew. A poly cover plate, 0.50” thick, shall be provided over the engine cover to provide a mounting surface for various components, and to allow the routing of wires beneath the cover to supply electrical power to such components.

The headliner shall be installed in both forward and rear cab sections. The headliner panel shall be a composition of an aluminum panel covered with a sound barrier and upholstery.

The cab structure shall include designated raceways for electrical harness routing from the front of the cab to the rear upper portion of the cab. Raceways shall be extruded in the forward door frame, floor, walls and overhead in the area where the walls meet the ceiling. The raceways located in the floor shall be covered by a textured aluminum extrusion, while the vertical and overhead raceways shall be covered by painted aluminum covers secured with removable screws.. The raceways shall improve harness integrity by providing a continuous harness path that eliminates wire chafing and abrasion associated with exposed wiring or routing through drilled metal holes. Harnesses shall be laid in place, not pulled. Routing through holes in tubing shall not be accepted due to chaffing that such installation causes.

The rear wall of the crew cab between the inboard, left-most forward-facing seat and the driver’s side wall of the cab shall be covered by a Pac Dual Trac mounting surface. The Pac Dual Trac shall be installed from floor level up to 36.00” above the floor.

156. CAB INTERIOR UPHOLSTERY

The cab interior upholstery shall be dark silver gray. All cab interior materials shall meet FMVSS 302 (flammability of interior materials).

157. CAB INTERIOR PAINT

The cab interior metal surfaces shall be painted fire smoke gray, vinyl texture paint.

158. CAB FLOOR

The cab and crew cab floor areas shall be covered with Polydamp-type acoustical floor mat consisting of a black pyramid rubber facing and closed cell foam decoupler.

The top surface of the material shall have a series of raised pyramid shapes, evenly spaced. Additionally, the material shall have a 0.25" thick closed cell foam (to prevent water absorption) to provide sound dampening.

159. CAB DEFROSTER

To provide maximum defrost and heating performance, a minimum 54,000 BTU heater-defroster unit with a minimum 550 SCFM of air flow shall be provided inside the cab. The defroster unit shall be strategically located under the center forward portion of the instrument panel. For easy access, a removable metal cover shall be installed over the defroster unit. The defroster shall include an integral aluminum frame air filter, high performance dual scroll blowers, and ducts designed to provide maximum defrosting capabilities for the 1-piece windshield. The defroster ventilation shall be built into the design of the cab dash instrument panel and shall be easily removable for maintenance. The defroster shall be capable of clearing 98 percent of the windshield and side glass when tested under conditions where the cab has been cold soaked at 0 degrees Fahrenheit for 10 hours, and a 2 ounce per square inch layer of frost/ice has been able to build up on the exterior windshield. The defroster system shall meet or exceed SAE J382 requirements.

160. CREW CAB HEATER

Two (2) 36,000 BTU minimum auxiliary heaters with minimum 275 SCFM (each unit) of air flow shall be provided inside the crew cab, one (1) under the right side outboard rear facing seat riser, and one (1) under the EMS cabinet. The heaters shall include high performance dual scroll blowers, one (1) for each unit. Outlets for the heaters shall be located below each rear facing riser and below the fronts of the right side seat and EMS compartment for efficient airflow. An extruded aluminum plenum shall be incorporated in the cab structure that shall transfer heat to the forward cab seating positions.

The heater/defroster and crew cab heaters shall be controlled by an integral electronic control panel. The heater control panel shall allow the driver to control heat flow to the front and rear independently. The control panel shall include variable adjustment for temperature and fan control, and be conveniently located on the dash in clear view of the driver. The control panel shall include highly visible, progressive LED indicators for both fan speed and temperature. Controls that are accessible by both the driver and the officer are preferred.

The above heater/defroster controls, with substantially similar control features, may be included as a component of the vehicle's electronic information and control system instead of a separate control panel.

161. AIR CONDITIONING

Due to the large space inside the cab, a high-performance, customized air conditioning system shall be furnished. A 19.10 cubic inch compressor shall be installed on the engine.

The air conditioning system shall be capable of cooling the average cab temperature from 100 degrees Fahrenheit to 64 degrees Fahrenheit in the forward section of the cab, and 69 degrees Fahrenheit in the rear section of the cab, at 50 percent relative humidity within 30 minutes. The cooling performance test shall be run only after the cab has been heat soaked at 100 degrees Fahrenheit for a minimum of 4 hours.

A roof-mounted condenser with a 63,000 BTU output minimum shall be installed on the cab roof. Mounting the condenser below the cab or body would reduce the performance of the system and shall not be acceptable.

The evaporator unit shall be installed in the rear portion of the cab ceiling over the engine tunnel. The evaporator shall include two (2) high performance cores and plenums with multiple outlets, one (1) plenum directed to the front and one (1) plenum directed to the rear of the cab.

The evaporator unit shall have a 49,000 BTU rating that meets or exceeds the performance specifications.

Adjustable air outlets shall be strategically located on the evaporator cover per the following:

- Four (4) shall be directed towards the drivers location
- Four (4) shall be directed towards the officers location
- Nine (9) shall be directed towards crew cab area

The air conditioner refrigerant shall be R-134A and shall be installed by a certified technician.

The air conditioner shall be controlled by dual zone integral electronic control panels for the heater, defroster and air conditioner. The cab control panel shall be located in the center console.

Heat and air conditioning controls shall also be integrated into the vehicle's electronic information system, and shall be controllable via mobile device when connected to the electronic information system.

For ease of operation, the control panels shall include variable adjustment for temperature and fan control.

162. INTERIOR CAB INSULATION

The cab walls, ceiling and engine tunnel shall be insulated in all strategic locations to maximize acoustic absorption and thermal insulation. The cab shall be insulated with 2.00" insulation in the rear wall, 3.00" insulation in the side walls, and 1.50" insulation in the ceiling. Headliners shall be constructed from a 0.20" high density polyethylene corrugated material. Each headliner shall be wrapped with a 0.25" thick foil faced poly damp low emissivity foam insulation barrier for acoustic and thermal control.

Designed for maximum sound absorption and thermal insulation, the rear cab wall shall be insulated with a 1.50" thick open cell acoustical foam. The thermal protection of the foam shall provide and R-value of at least four (4) per 1.00" thickness.

163. SUN VISORS

There shall be two (2) dark Lexan sun visors provided. The sun visors shall be located above the windshield with one (1) mounted on each side of the cab.

There shall be a polished stainless steel bracket provided to help secure each sun visor in the stowed position. The bracket shall positively secure the visor, and shall not rely on friction to prevent rotation of the visor into the downward position.

164. GRAB HANDLES

A black rubber covered grab handle shall be mounted on the door post of the driver side cab door to assist in entering the cab. The grab handle shall be securely mounted to the post area between the door and windshield.

A long rubber grab handle shall be mounted on the dash board in front of the officer, allowing sufficient space for the mounting of a laptop computer on the dash board on a slide-out tray.

A long grab handle, constructed of knurled aluminum, minimum 1.00” diameter, shall be installed on each of the crew cab doors. The long grab handles shall be installed diagonally, with the low end on the non-hinge side of the door, and the high end adjacent to the hinge. The handles shall not block or interfere with the doors' windows.

A long rubber grab handle shall be installed on the striker side on both crew cab door frames, inside the vehicle.

165. ENGINE COMPARTMENT LIGHT

An engine compartment light shall be installed under the engine hood, with an integral switch. The light shall have a 0.125" diameter weep hole in the bottom of its lens to prevent moisture retention.

166. ACCESS TO ENGINE DIPSTICKS

For access to the engine oil and transmission fluid dipsticks, there shall be a door on the engine tunnel, inside the crew cab. The door shall be on the rear wall of the engine tunnel, on the vertical surface. The door shall be 17.75" wide x 12.75" high and be flush with the wall of the engine tunnel.

The engine oil dipstick shall allow for checking only. The transmission dipstick shall allow for both checking and filling. An additional tube shall be provided at the access door for filling the engine oil.

The door shall have a rubber seal for thermal and acoustic insulation. One (1) flush latch shall be provided on the access door.

167. MAP BOX

There shall be one (1) map box with three (3) bins, open at top. The map box shall be installed on the engine tunnel to the left of the officer's seat. The map box(es) shall be divided into three (3) bins, each being 12.50" wide x 3.00" high x 12.00" deep. Each bin shall slant 30 degrees from horizontal, towards the front of the vehicle. The map box shall be constructed of 0.125" aluminum and shall be painted to match the cab interior. Exact placement shall be determined during the Preconstruction Conference.

168. CAB SAFETY SYSTEM

The cab shall be provided with a safety system designed to protect occupants in the event of a side roll or frontal impact, and shall include the following:

• A supplemental restraint system (SRS) sensor shall be installed on a structural cab member behind the instrument panel. The SRS sensor shall perform real time diagnostics of all critical subsystems and shall record sensory inputs immediately before and during a side roll or frontal impact event.
• A slave SRS sensor shall be installed in the cab to provide capacity for all cab seating positions.
• A fault-indicating light shall be provided on the vehicle's instrument panel allowing the driver to monitor the operational status of the SRS system.
• Fault indications and monitoring shall be additionally controlled by the vehicle's electronic information system.
• A driver side front air bag shall be mounted in the steering wheel and shall be designed to protect the head and upper torso of the occupant, when used in combination with the 3-point seat belt.
• A passenger side knee bolster air bag shall be mounted in the modesty panel below the dash panel and shall be designed to protect the legs of the occupant, when used in combination with the 3-point seat belt.
• Air curtains shall be provided in the outboard bolster of outboard seat backs to provide a cushion between occupant and the cab wall.
• Suspension seats shall be provided with devices to retract them to the lowest travel position during a side roll or frontal impact event.
• Seat belts shall be provided with pre-tensioners to remove slack from the seat belt during a side roll or frontal impact event.

169. FRONTAL IMPACT PROTECTION

The SRS system shall provide protection during a frontal or oblique impact event. The system shall activate when the vehicle decelerates at a predetermined G force known to cause injury to the occupants. The cab and chassis shall have been subjected, via third party test facility, to a crash impact during frontal and oblique impact testing. Testing included all major chassis and cab components such as mounting straps for fuel and air tanks, suspension mounts, front suspension components, rear suspensions components, frame rail cross members, engine and transmission and their mounts, pump house and mounts, frame extensions and body mounts. The testing provided configuration specific information used to optimize the timing for firing the safety restraint system. The sensor shall activate the pyrotechnic devices when the correct crash algorithm, wave form, is detected.

The SRS system shall deploy the following components in the event of a frontal or oblique impact event:

• Driver side front air bag
• Passenger side knee bolster air bag
• Air curtains mounted in the outboard bolster of outboard seat backs
• Suspension seats shall be retracted to the lowest travel position
• Seat belts shall be pre-tensioned to firmly hold the occupant in place

170. SIDE ROLL PROTECTION

The SRS system shall provide protection during a fast or slow 90 degree roll to the side, in which the vehicle comes to rest on its side. The system shall analyze the vehicle's angle and rate of roll to determine the optimal activation of the advanced occupant restraints.

The SRS system shall deploy the following components in the event of a side roll:

- Air curtains mounted in the outboard bolster of outboard seat backs
- Suspension seats shall be retracted to the lowest travel position
- Seat belts shall be pre-tensioned to firmly hold the occupant in place

171. SEATING CAPACITY

The seating capacity of the cab shall be five (5).

172. OFFICER'S SEAT

A seat shall be provided in the cab for the officer. The seat shall be a cam action type with air suspension. To maintain optimal seat position and ride quality for a broader range of occupant sizes, the suspension shall be provided with a height control valve that automatically positions the seat in the center of the suspension travel (1.88") when the occupant sits down. For increased convenience, the seat shall include a manual control to adjust the horizontal position (6.00" travel). The manual horizontal control shall be a towel-bar style located below the forward part of the seat cushion. For optimal comfort, the seat shall be provided with 17.00" deep dual density foam cushions designed with EVC (elastomeric vibration control). To ensure safe operation, the seat shall be equipped with seat belt sensors in the seat cushion and belt receptacle that shall activate an alarm on the vehicle electronic information display indicating a seat is occupied but not belted.

The seat back shall be an SCBA back style with 7.5 degree fixed recline angle, and shall include minimum 4.50" wide x 7.50" deep side bolster pads for maximum support. The SCBA cavity shall be adjustable from front to rear in 1.00" increments, to accommodate different sized SCBA cylinders. Moving the SCBA cavity shall be accomplished by unbolting, relocating, and re-bolting it in the desired location. The cavity shall be able to hold Scott Air Pack 75 SCBAs with 30-, 45-, and 60-minute cylinders.

The seat shall include the following features incorporated into the side roll protection system:

• Side air curtain shall be mounted integral to the outboard bolster of the seat back. The air curtain shall be covered by a decorative panel when in the stowed position.

• A suspension seat safety system shall be included. When activated, this system shall pretension the seat belt and then retract the seat to its lowest travel position.

The seat shall be furnished with a three (3)-point, shoulder type seat belt. To provide quick, easy use for occupants wearing bunker gear, the seat belt shall have a minimum 120.00" shoulder length and 55.00"

lap length. The seat belt tongue shall be stored at waist position for quick application by the seat occupant. The seat belt receptacle shall be provided on a cable stalk conveniently nested next to the seat cushion, providing easy accessibility while wearing turnout gear. The seat belt shall be furnished with dual automatic retractors that shall provide ease of operation in the normal seating position.

173. DRIVER'S SEAT

A seat shall be provided in the cab for the driver. The seat shall be a cam action type, with air suspension. For increased convenience, the seat shall include a manual control to adjust the horizontal position (6.00" travel). The manual horizontal control shall be a towel-bar style located below the forward part of the seat cushion. To provide flexibility for multiple passenger configurations, the seat shall have a reclining back adjustable from 20 degrees back to 0 degrees forward. The seat back shall be a high back style with manual lumbar adjustment lever, and shall include minimum 7.50" deep side bolster pads for maximum support. For optimal comfort, the seat shall be provided with 17.00" deep dual density foam cushions designed with EVC (elastomeric vibration control). To ensure safe operation, the seat shall be equipped with seat belt sensors in the seat cushion and belt receptacle that shall activate an alarm on the vehicle electronic information display indicating a seat is occupied but not buckled.

The seat shall include the following features incorporated into the side roll protection system.

Side air curtain shall be mounted integral to the outboard bolster of the seat back. The air curtain shall be covered by a decorative panel when in the stowed position.

A suspension seat safety system shall be included. When activated this system shall pretension the seat belt and retract the seat to its lowest travel position.

The seat shall be furnished with a three (3)-point, shoulder type seat belt. To provide quick, easy use for occupants wearing bunker gear, the seat belt shall have a minimum 120.00" shoulder length and 55.00" lap length. The seat belt tongue shall be stored at waist position for quick application by the seat occupant. The seat belt receptacle shall be provided on a cable stalk conveniently nested next to the seat cushion, providing easy accessibility while wearing turnout gear. The seat belt shall be furnished with dual automatic retractors that shall provide ease of operation in the normal seating position.

174. REAR FACING PASSENGER SIDE OUTBOARD SEAT

There shall be one (1) rear facing seat provided at the passenger side outboard position in the crew cab. For optimal comfort, the seat shall be provided with 17.00" deep dual density foam cushions designed with EVC (elastomeric vibration control). To ensure safe operation, the seat shall be equipped with seat belt sensors in the seat cushion and belt receptacle that shall activate an alarm on the vehicle electronic information display indicating a seat is occupied but not buckled.

The seat back shall be an SCBA back style with 7.50 degree fixed recline angle, and shall include minimum 4.50" wide x 7.50" deep side bolster pads for maximum support. The SCBA cavity shall be adjustable from front to rear in 1.00" increments to accommodate different sized SCBA cylinders. Moving the SCBA cavity shall be accomplished by unbolting, relocating, and re-bolting it in the desired

location. The SCBA cavity shall be able to hold a Scott Air Pack 75 with 30-, 45-, and 60-minute cylinders.

The seat shall include the following features incorporated into the side roll protection system.

Side air curtain shall be mounted integral to the outboard bolster of the seat back. The air curtain shall be covered by a decorative panel when in the stowed position.

A seat safety system shall be included. When activated this system shall pretension the seat belt and firmly hold the occupant in the event of a side roll.

The seat shall be furnished with a three (3)-point, shoulder type seat belt. To provide quick, easy use for occupants wearing bunker gear, the seat belt shall have a minimum 120.00" shoulder length and 55.00" lap length. The seat belt tongue shall be stored at waist position for quick application by the seat occupant. The seat belt receptacle shall be provided on a cable stalk conveniently nested next to the seat cushion, providing easy accessibility while wearing turnout gear. The seat belt shall be furnished with dual automatic retractors that shall provide ease of operation in the normal seating position.

175. FORWARD FACING CENTER SEATS

There shall be two (2) forward facing seats provided at the center position in the crew cab. For optimal comfort, the seats shall be provided with 17.00" deep dual density foam cushions designed with EVC (elastomeric vibration control). To ensure safe operation, the seats shall be equipped with seat belt sensors in the seat cushion and belt receptacle that shall activate an alarm on the vehicle electronic information display indicating a seat is occupied but not buckled.

The seat backs shall be an SCBA back style with 7.50 degree fixed recline angle, and shall include minimum 4.50" wide x 7.50" deep side bolster pads for maximum support. The SCBA cavity shall be adjustable from front to rear in 1.00" increments, to accommodate different sized SCBA cylinders. Moving the SCBA cavity shall be accomplished by unbolting, relocating, and re-bolting it in the desired location. The SCBA cavity shall be able to hold a Scott Air Pack 75 with 30-, 45-, and 60-minute cylinders.

The seats shall include the following feature incorporated into the side roll protection system.

A seat safety system shall be included. When activated, this system shall pretension the seat belts around the occupants to firmly hold them in place in the event of a side roll.

The seats shall be furnished with three (3)-point, shoulder type seat belts. To provide quick, easy use for occupants wearing bunker gear, the seat belts shall have a minimum 130.00" shoulder length and 55.00" lap length. The seat belt tongue shall be stored at waist position for quick application by the seat occupant. The seat belt receptacle shall be provided on a cable conveniently nested next to the seat cushion, providing easy accessibility. The seat belts shall be furnished with dual automatic retractors that shall provide ease of operation in the normal seating position.

176. SEAT UPHOLSTERY

All seat upholstery shall be gray “Turnout Tuff” style material. Vinyl-type materials or thin fabric shall not be acceptable.

177. SCBA HOLDERS

All SCBA type seats in the cab shall have a "Hands-Free" auto-clamp style bracket in its backrest. For efficiency and convenience, the bracket shall include an automatic spring clamp that allows the occupant to store the SCBA bottle by simply pushing it into the seat back. For protection of all occupants in the cab, in the event of an accident, the inertial components within the clamp shall constrain the SCBA cylinder in the seat and shall exceed the NFPA 1901 standard of 9G. Bracket designs with manual restraints (belts, straps, buckles, etc.) that could be inadvertently left unlocked and allow the SCBA to move freely within the cab during an accident, shall not be acceptable.

SCBA shall be removed from the holder by slowly pulling the unit from the holder. Systems that utlilize pull-cables or handles shall not be acceptable.

The SCBA holder shall be acceptable for use with Scott Air-Pak 75 with 45-minute, 4500psi carbon fiber wrap cylinders.

SCBA holders that mar or damage the surface of carbon fiber wrapped SCBA cylinders shall not be acceptable.

There shall be four (4) SCBA brackets, one each in the three crew cab seat backs, and one in the officer’s seat back.

178. SEAT BELTS

All seating positions in the cab and crew cab shall have orange or red seat belts.

The belts shall also include an extension assembly to the shoulder belt system. The extension shall add an extender arm to the seat belt D-loop location, placing the D-loop in a closer, easier to reach location.

179. SHOULDER HARNESS HEIGHT ADJUSTMENT

All seating positions furnished with three (3)-point shoulder type seat belts shall include a height adjustment. This adjustment shall optimize the belts effectiveness and comfort for the seated firefighter.

A total of five (5) seating positions shall have the adjustable shoulder harness.

180. SEAT BELT MONITORING SYSTEM

A seat belt monitoring system (SBMS) shall be provided. The SBMS shall monitor all five (5) seating positions indicating the status of each seat position with a green or red indicator as follows:

- Seat Occupied & Buckled = Green

- Seat Occupied & Unbuckled = Red
- No Occupant & Buckled = Red
- No Occupant & Unbuckled = Not Illuminated or Indicated

The seat belt monitoring system shall be a component of the vehicle's electronic information system.

181. SEAT BELT AUDIBLE ALARM

The Seat Belt Monitoring System shall include an audible alarm that shall be activated when a red illumination condition exists and the parking brake is released, or the transmission is not in neutral.

182. RADIO COMPARTMENT

A compartment for the radio amplifiers and DVR/Camera Controller shall be located on the floor of the cab behind the front passenger's seat. A lift-up door with a chrome plated lift and turn latch shall be provided for access. The compartment shall be constructed of smooth aluminum and painted to match the cab interior. The radio controls shall be located in the overhead console on the passenger's side (three radios) and driver's side (one radio).

The radio compartment shall be of adequate size to contain four (4) Motorola APX6500 radios and a Safety Vision Observer SVR 4112 camera controller/recorder, with associated power, communication, and antenna cables and connectors. Sufficient venting shall be provided to adequately cool the radios and camera controller/recorder

If the area behind the passenger/officer's seat is insufficient to provide adequate space for the radio compartment, alternate locations may be entertained with the agreement RIAC.

183. HELMET HOLDERS

There shall be five (5) Zico, Model UHH-1, helmet holder brackets provided in the cab. The brackets shall provide quick access and secure storage of the helmets. The bracket locations shall be determined at time of final inspection.

184. CAB DOME LIGHTS

There shall be four (4) dual LED dome lights with black bezels provided. Two (2) lights shall be mounted above the inside shoulder of the driver and officer and two (2) lights shall be installed and located, one (1) on each side of the crew cab.

The color of the LED's shall be red and white.

The red LED's shall be controlled by the door switches and the lens switch.

The white LED's shall be controlled by the lens switch.

In order to ensure exceptional illumination, each white LED dome light shall provide a minimum of 10.1 foot-candles (fc) covering an entire 20.00" x 20.00" square seating position when mounted 40.00" above the seat.

185. OVERHEAD MAP LIGHTS

There shall be two (2) white halogen, round adjustable map lights installed in the cab:

- One (1) overhead in front of the driving position.
- One (1) overhead in front of the passenger's position.

Each light shall include a switch on the light housing.

The light switches shall be connected directly to the battery (not switched) power.

186. GOOSENECK STYLE LIGHT

A gooseneck style reading light, Littlelite L-5 LED or equal, with an 18.00” flexible arm shall be installed at the officer’s seating position. The light shall be selectable between red and white illumination. Specific mounting location will be determined at the Preconstruction Conference.

187. EMS COMPARTMENT

An EMS compartment shall be provided in the cab behind the driver’s seat. The compartment shall be capable of holding three EMS bags with the following measurements:

- Bag 1: 15.00 inches x 21.00 inches x 27.00 inches
- Bag 2: 22.00 inches x 30.00 inches x 12.00 inches
- Bag 3: 16.00 inches x 16.00 inches x 8.00 inches

The compartment shall have one (1) Amdor roll up door, non-locking, with plain aluminum finish. The opening into the compartment shall be free of projections or sharp corners that can catch or tear a cloth EMS bag when it is removed from the compartment.

The compartment shall be constructed of smooth aluminum, and painted inside and outside to match the cab interior.

188. EMS COMPARTMENT LIGHT

There shall be one (1) white Amdor LED strip light installed on the left side of the compartment opening. The lights shall be controlled by an automatic door switch when the door is opened.

189. EMS COMPARTMENT SHELVING

There shall be two (2) shelves provided. Each shelf shall be constructed of 0.090" aluminum with a 1.25" up-turned lip. Shelving shall be infinitely adjustable by means of a threaded tightener sliding in a track.

The tracks shall run the full height of the compartment. A 2.00” x 2.00” notch, with all burrs and sharp corners removed, shall be cut out of the right rear corner of both shelves to allow electrical cords to pass through the shelves.

190. METER COMPARTMENT

There shall be a compartment for the storage of meters and other small equipment mounted in the crew cab on the officer’s side, between the rear cab door and the rear cab wall, with the opening facing the front of the vehicle. The depth and width of the compartment shall be determined at the Preconstruction Conference, but should not exceed 14.00” in width.. The compartment shall go from the cab floor to the ceiling, with the opening maximized to allow access into the compartment. An Amdor roll-up door of an appropriate size shall be provided. No lighting is required inside this compartment. Five adjustable shelves shall be provided inside the compartment, with a 2.00” by 2.00” notched right rear corner on each shelf to allow electrical charger cords to be passed through the shelves.

191. CAB INSTRUMENTATION

The cab instrument panel shall consist of gauges, an LCD display, telltale indicator lights, alarms, control switches, and a diagnostic panel. The function of instrument panel controls and switches shall be identified by a label adjacent to each item. Actuation of the headlight switch shall illuminate the labels in low light conditions. Telltale indicator lamps shall not be illuminated unless necessary. The cab instruments and controls shall be conveniently located within the forward cab section directly forward of the driver. Gauge and switch panels shall be designed to be removable for ease of service and low cost of ownership.

192. GAUGES

The gauge panel shall include the following ten (10) ivory gauges with chrome bezels to monitor vehicle performance:

- Voltmeter gauge (Volts)
  - Low volts (11.8 VDC)
    - Amber indicator on gauge assembly with alarm
  - High volts (15 VDC)
    - Amber indicator on gauge assembly with alarm
  - Very low volts (11.3 VDC)
    - Amber indicator on gauge assembly with alarm
  - Very high volts (16 VDC)
    - Amber indicator on gauge assembly with alarm
- Tachometer (RPM)
- Speedometer (Primary (outside) MPH, Secondary (inside) Km/H)
- Fuel level gauge (Empty - Full in fractions)
  - Low fuel (1/8 full)
    - Amber indicator on gauge assembly with alarm
  - Very low fuel (1/32) fuel

        - Amber indicator on gauge assembly with alarm
- Engine oil pressure gauge (PSI)
    - Low oil pressure to activate engine warning lights and alarms
        - Red indicator on gauge assembly with alarm
- Front air pressure gauge (PSI)
    - Low air pressure to activate warning lights and alarm
        - Red indicator on gauge assembly with alarm
- Rear air pressure gauge (PSI)
    - Low air pressure to activate warning lights and alarm
        - Red indicator on gauge assembly with alarm
- Transmission oil temperature gauge (Fahrenheit)
    - High transmission oil temperature activates warning lights and alarm
        - Amber indicator on gauge assembly with alarm
- Engine coolant temperature gauge (Fahrenheit)
    - High engine temperature activates an engine warning light and alarm
        - Red indicator on gauge assembly with alarm
- Diesel Exhaust Fluid Level Gauge (Empty - Full in fractions)
    - Low fluid (1/8 full)
        - Amber indicator on gauge assembly with alarm

All gauges and gauge indicators shall perform prove out at initial power-up to ensure proper performance.

193. INDICATOR LAMPS

To promote safety, the following telltale indicator lamps shall be integral to the gauge assembly and are located above and below the center gauges. The indicator lamps shall be "dark panel" design that is only visible when active. The colored indicator lights shall have descriptive text or symbols.

The following amber telltale lamps shall be present:

- Low coolant
- Trac cntl (traction control)
- Check engine
- Check trans (check transmission)
- Aux brake overheat (Auxiliary brake overheat)
- Air rest (air restriction)
- Caution (triangle symbol)
- Water in fuel
- DPF (engine diesel particulate filter regeneration)
- Trailer ABS (where applicable)
- Wait to start (where applicable)
- HET (engine high exhaust temperature)
- ABS (antilock brake system)
- MIL (engine emissions system malfunction indicator lamp)
- SRS (supplemental restraint system) fault

- DEF (low diesel exhaust fluid level)

The following red telltale lamps shall be present:

- Warning (stop sign symbol)
- Seat belt
- Parking brake
- Stop engine

The following green telltale lamps shall be provided:

- Left turn
- Right turn
- Battery on

The following blue telltale lamp shall be provided:

- High beam

194. ALARMS

Audible steady tone warning alarm: A steady audible tone alarm shall be provided whenever a warning message is present.

Audible pulsing tone caution alarm: A pulsing audible tone alarm (chime/chirp) shall be provided whenever a caution message is present without a warning message being present.

Alarm silence: Any active audible alarm shall be able to be silenced by holding the ignition switch at the top position for three (3) to five (5) seconds. For improved safety, silenced audible alarms shall intermittently chirp every 30 seconds until the alarm condition no longer exists. The intermittent chirp shall act as a reminder to the operator that a caution or warning condition still exists. Any new warning or caution condition shall enable the steady or pulsing tones respectively.

195. INDICATOR LAMP AND ALARM PROVE-OUT

Telltale indicators and alarms shall perform prove-out at initial power-up to ensure proper performance.

196. CONTROL SWITCHES

For ease of use, the following controls shall be provided immediately adjacent to the cab instrument panel within easy reach of the driver.

Emergency master switch: A molded plastic push button switch with integral indicator lamp shall be provided. Pressing the switch shall activate emergency response lights and siren control. A green lamp on the switch provides indication that the emergency master mode is active. Pressing the switch again disables the emergency master mode.

Headlight / Parking light switch: A three (3)-position maintained rocker switch shall be provided. The first switch position shall deactivate all parking lights and the headlights. The second switch position shall activate the parking lights. The third switch position shall activate the headlights.

Panel backlighting intensity control switch: A three (3)-position momentary rocker switch shall be provided. The first switch position shall decrease the panel backlighting intensity to a minimum level as the switch is held. The second switch position is the default/neutral position that does not affect the backlighting intensity. The third switch position shall increase the panel backlighting intensity to a maximum level as the switch is held.

The following standard controls shall be integral to the gauge assembly and are located below the right hand gauges. All switches have backlit labels for low light applications.

High idle engagement switch: A two (2)-position momentary rocker switch with integral indicator lamp sall be provided. The first switch position is the default switch position. The second switch position shall activate and deactivate the high idle function when pressed and released. The "Ok To Engage High Idle" indicator lamp must be active for the high idle function to engage. A green indicator lamp integral to the high idle engagement switch shall indicate when the high idle function is engaged.

"Ok To Engage High Idle" indicator lamp: A green indicator light shall be provided next to the high idle activation switch to indicate that the interlocks have been met to allow high idle engagement.

The following standard controls shall be provided adjacent to the cab gauge assembly within easy reach of the driver. All switches shall have backlit labels for low light applications.

Ignition switch: A three (3)-position maintained/momentary rocker switch shall be provided. The first switch position shall deactivate vehicle ignition. The second switch position shall activate vehicle ignition. The third momentary position shall disable the vehicle electronic information system audible alarm if held for three (3) to five (5) seconds. A green indicator lamp shall be activated with vehicle ignition.

Engine start switch: A two (2)-position momentary rocker switch shall be provided. The first switch position is the default switch position. The second switch position shall activate the vehicle's engine. The switch actuator is designed to prevent accidental activation.

4-way hazard switch: A two (2)-position maintained rocker switch shall be provided. The first switch position shall deactivate the 4-way hazard switch function. The second switch position shall activate the 4-way hazard function. The switch actuator shall be red and includes the international 4-way hazard symbol.

Heater, defroster, and optional air conditioning control panel: A control panel with membrane switches shall be provided to control heater/defroster temperature and heater, defroster, and air conditioning fan speeds. A green LED status bar shall indicate the relative temperature and fan speed settings.

Turn signal arm: A self-canceling turn signal with high beam headlight and windshield wiper/washer controls shall be provided. The windshield wiper control shall have high, low, and intermittent modes.

Parking brake control: An air actuated push/pull park brake control valve shall be provided.

Chassis horn control: Activation of the chassis horn control shall be provided through the center of the steering wheel.

197. CUSTOM SWITCH PANELS

The design of cab instrumentation shall allow for emergency lighting and other switches to be placed within easy reach of the operator thus improving safety. There shall be positions for four (4) switch panels in the overhead console on the driver's side, four (4) switch panels in the engine tunnel console facing the driver, four (4) switch panels in the overhead console on the officer's side and two (2) switch panels in the engine tunnel console facing the officer. All switches shall have backlit labels for low light applications.

198. DIAGNOSTIC PANEL

A diagnostic panel 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 panel shall include the following:

- Engine diagnostic port
- Transmission diagnostic port
- ABS diagnostic port
- SRS diagnostic port (where applicable)
- Vehicle Electronic Information System USB diagnostic port
- Engine diagnostic switch (blink codes flashed on check engine telltale indicator)
- ABS diagnostic switch (blink codes flashed on ABS telltale indicator)
- Diesel particulate filter regeneration switch
- Diesel particulate filter regeneration inhibit switch

199. CAB LCD DISPLAY

A digital four (4)-row by 20-character dot matrix display shall be integral to the gauge panel. The display shall be capable of showing simple graphical images as well as text. The display shall be split into three (3) sections. Each section shall have a dedicated function. The upper left section shall display the outside ambient temperature.

The upper right section shall display, along with other configuration specific information:

- Odometer
- Trip mileage
- PTO hours
- Fuel consumption
- Engine hours

The bottom section shall display INFO, CAUTION, and WARNING messages. Text messages shall automatically activate to describe the cause of an audible caution or warning alarm. The LCD shall be capable of displaying multiple text messages should more than one caution or warning condition exist.

200. AIR RESTRICTION INDICATOR

A high air restriction warning indicator light LCD message with amber warning indicator and audible alarm shall be provided.

201. PUMP PRESSURE GAUGE IN CAB

There shall be a digital pump pressure gauge installed in the cab and manufactured by Class 1. The display shall be completely electronic using a transducer to sense both vacuum and pressure.

The pressure gauge shall be installed in the dash or center console and labeled “PUMP PRESSURE”.

202. "DO NOT MOVE APPARATUS" INDICATOR

A flashing red indicator light, located in the driving compartment, shall be illuminated automatically per the current NFPA 1901 requirements. The light shall be labeled "Do Not Move Apparatus If Light Is On."

If the indicator light is of a rotating beacon type, or it is mounted at eye level within the cab, the light shall have an opaque shield or guard to prevent the light from flashing directly into the driver’s or officer’s eyes when seated.

A steady tone alarm shall activate when the “Do Not Move Apparatus” indicator is illuminated.

203. DO NOT MOVE TRUCK MESSAGES

Messages shall be displayed on the gauge panel LCD located forward of the steering wheel directly in front of the driver whenever the Do Not Move Apparatus light is active. The messages shall designate the item or items not in the stowed for vehicle travel position (parking brake disengaged).

The following messages shall be displayed as appropriate:

- Do Not Move Truck
- DS Cab Door Open (Driver Side Cab Door Open)
- PS Cab Door Open (Passenger's Side Cab Door Open)
- DS Crew Cab Door Open (Driver Side Crew Cab Door Open)
- PS Crew Cab Door Open (Passenger's Side Crew Cab Door Open)
- DS Body Door Open (Driver Side Body Door Open)
- PS Body Door Open (Passenger's Side Body Door Open)
- Rear Body Door Open
- Deck Gun Not Stowed
- Hatch Door Open
- Steps Not Stowed

Any other device that is opened, extended, or deployed that creates a hazard or is likely to cause major damage to the apparatus if the apparatus is moved shall be displayed as a caution message after the parking brake is disengaged.

204. SWITCH PANELS

The emergency light switch panel shall have a master switch for ease of use plus individual switches for selective control. Each switch panel shall contain up to eight (8) soft-touch type switches each rated for two hundred thousand (200,000) cycles. Panels with less than eight (8) switches shall include indicators or blanks. The switch panel(s) shall be located in the "overhead" position above the windshield on the driver side overhead to allow for easy access.

The switches shall be push button type and include an integral indicator light. For quick, visual indication the switch shall be internally illuminated red whenever the switch is active. A 2-ply, scratch resistant, laser engraved Gravoply label indicating the use of each switch shall be placed below the switches. The label shall allow light to pass through the letters for improved visibility in low light conditions. Switches and light source shall be integral to the switch panel assembly.

205. WIPER CONTROL

For simple operation and easy reach, the windshield wiper control shall be an integral part of the directional light lever located on the steering column. The wiper control shall include high and low wiper speed settings, a one (1)-speed intermittent wiper control and windshield washer switch. The control shall have a "return to park" provision, which allows the wipers to return to the stored position when the wipers are not in use.

206. VEHICLE ELECTRONIC INFORMATION SYSTEM

A vehicle electronic information system employing a 7.00" diagonal color graphics LCD touch screen display shall be encased in an ABS plastic housing.

The information center shall have the following specifications:

- Operate in temperatures from -40 to 185 degrees Fahrenheit
- An Optical Gel shall be placed between the LCD and protective lens
- Five weather resistant user interface switches, redundant to the touch screen
- Five-wire resistive screen, usable with gloved hands
- Sunlight Readable
- Minimum of 400nits rated display

207. INFORMATION SYSTEM OPERATION

The information system shall be designed for easy operation for everyday use.

All button labels shall be specific to the information being viewed.

Push buttons shall be provided to utilize the on-screen menus, in addition to the touch screen button itself.

Faults, warnings, and caution messages shall be logged internally to the information center for later download and review.

The information center shall be equipped to communicate to a mobile device such as an iPad/iPhone, or Android via Wi-Fi or Bluetooth.

208. INFORMATION SYSTEM GENERAL SCREEN DESIGN

Where possible, background colors shall be used to provide "At a Glance" vehicle information. If information provided on a screen is within acceptable limits, a green background shall be used.

If a caution or warning situation arises the following shall occur:

- An amber background/text color shall indicate a caution condition
- A red background/text color shall indicate a warning condition

The system shall display the ambient exterior temperature and the current time (12 or 24 hour mode).

The information center shall have a mode to display text messages for audible alarm tones. The text messages shall be written in a manner to clearly identify the item(s) causing the audible alarm to sound. If more than one (1) text message occurs, the messages shall cycle every second until the problem(s) have been resolved. The screen background color for this mode shall change to indicate the severity of the "warning" message, preferably yellow for caution messages and red for warning messages. If a warning and a caution condition occur simultaneously, the red background color shall be shown for all messages on the page.

209. INFORMATION SYSTEM PAGE SCREENS

The information system shall include the following screens:

- Load Manager Screen
  - A list of items to be load managed shall be provided. The list shall provide:
    - Description of the load
  - Individual Load Shed Priority Screen
    - The lower the priority number, the earlier the device shall be shed should a low voltage condition occur
  - Load Status Screen
    - The screen shall indicate if a load has been shed (disabled) or not shed.
    - "At a Glance" color features are utilized on this screen
- Lighting controls for the vehicle, as a backup to the cab switches
- HVAC controls for the vehicle cab

- Tire pressure monitoring

- Do Not Move Truck Screen
    - The screen shall indicate the approximate location and type of item that is open or is not stowed for travel. The actual status of the following devices shall be indicated:
        - Driver Side Cab Door
        - Passenger's Side Cab Door
        - Driver Side Crew Cab Door
        - Passenger's Side Crew Cab Door
        - Driver Side Body Doors
        - Passenger's Side Body Doors
        - Rear Body Door(s)
        - Deck Gun
        - Hatch Doors
        - Steps

- Chassis Information Screen
    - Engine RPM
    - Fuel Level
    - Battery Voltage
    - Engine Coolant Temperature
    - Engine Oil Pressure
    - Engine, pump, and transmission prognostics
    - Vehicle system faults in plain text. Codes that require cross-referencing shall not be acceptable.

- Active Alarms List
    - This screen shall show a list of all active warning messages. The date and time the message occurred is displayed with each message in the list.

210. INFORMATION SYSTEM MENU SCREENS

The following information shall be available through the system:

- System Information
- Battery Volts
- Pump Hours
- Transmission Oil Temperature
- Pump Engaged
- Engine Coolant Level
- Engine Oil Level
    - Oil level shall only be shown when the engine is not running
- Power Steering Level
- Configure Video Mode

    - Set Video Contrast/Color/Tin/Brightness
- Startup Screen
    - Choose the screen that shall be active at vehicle power-up
- Date & Time
    - 12 or 24 hour format
    - Set time and date
- View Active Alarms
    - Shows a list of all active alarms
    - Date and time of the occurrence is shown with each alarm
    - Silence alarms
- System Diagnostics
    - Module type and ID number
    - Module version
- Module diagnostics information
    - Input or output number
    - Circuit number connected to that input or output
    - Circuit name (item connected to the circuit)
    - Status of the input or output
    - Power and Constant Current module diagnostic information

Button functions and button labels may change with each screen.

211. VEHICLE DATA RECORDER

A vehicle data recorder (VDR) shall be provided. The VDR shall be capable of reading and storing vehicle information for download.

The information stored on the VDR shall be able to be downloaded through a USB port mounted in a convenient location within the cab. A CD provided with the apparatus shall include any software required to download, view, and store the information from the VDR. A USB cable shall be used to connect the VDR to a Windows-based laptop to retrieve required information.

The vehicle data recorder shall be capable of recording the following data via hardwired and/or CAN inputs:

- Vehicle Speed - MPH
- Acceleration - MPH/sec
- Deceleration - MPH/sec
- Engine Speed - RPM
- Engine Throttle Position - % of Full Throttle
- ABS Event - On/Off
- Seat Occupied Status - Yes/No by Position (all seats)
- Seat Belt Buckled Status - Yes/No by Position (all seats)
- Master Optical Warning Device Switch - On/Off
- Time - 24 Hour Time

- Date - Year/Month/Day

212. REAR VISION CAMERA SYSTEM

There shall be a color vehicle camera system provided with one (1) camera located at the rear of the apparatus, pointing rearward and downward, displayed automatically when the transmission is placed in reverse.

The camera image shall be displayed on a 7.00" LCD display located in view of the driver on the dash. The display shall include manual camera activation capability and audio from the active camera. The vehicle information system display may be used for this display in lieu of the 70RP display.

The following components will be included:

- One (1) Safety Vision model 70RP display
- One (1) Safety Vision model 625B camera with audio and IR illuminators
- All necessary cables

213. REAR VISION CAMERA GUARD

There shall be one (1) aluminum tread plate guard(s) fastened over the rear vision camera located as close to the center of the rear bulkhead and as high as possible.

214. THERMAL IMAGING CAMERA, COLOR DIGITAL VIDEO CAMERA, AND DVR SYSTEM

A pan and tilt, thermal imaging camera shall be provided on the cab roof, as well as a color digital video camera located in the cab. Images from both cameras shall be recorded on an in-truck digital video recorder.

Images from the Thermal Imaging Camera and Color Digital Video Camera shall be displayed on a Safety Vision model CP4, 7.00" Multi-Function LCD monitor or equal with swivel bracket located in view of the driver and officer on the dash. The monitor shall be able to show either the thermal imaging camera or the front-mounted color digital camera individually, or both together at the same time, selectable on the monitor itself..

The thermal imaging camera shall be provided as below:

- A FLIR M625 XP marine thermal imaging camera with pan and tilt, with joystick control from inside the cab
- 640 x 480 Vanadium Oxide sensor
- 25 x 20 degree field of view
- 180 degree pan minimum
- +/- 45 degree tilt

- Mounted centered on the cab roof, in front of the light bar, with an unobstructed view from 15 feet in front of the truck (at 0 degrees left/right) to infinity at level.
- Mounted in a manner that provides a water- and weather-tight seal with the cab roof.
- A FLIR M-Series pan/tilt controller for the thermal imaging camera shall be provided in the cab, accessible by both the driver and the officer.
- The controller and thermal imaging camera shall power-up when the vehicle's ignition switch is in the "on" position.

The digital video camera shall comply with the following:

The camera shall be a Safety Vision 41 Series dome camera, analog color camera **without** IR illuminators in a black housing or equal, ceiling-mounted inside the cab of the truck, viewing the scene outside of the front windshield. The camera shall be mounted in an area where it minimizes the amount of visual obstruction to the driver and officer, and in an area where the windshield wipers clear the glass in front of the camera. The camera shall be properly wired to the DVR to record the output from the camera, and shall operate whenever the ignition switch is in the "on" position.

The Digital Video Recorder shall comply with the following:

The recorder shall be a Safety Vision Observer, model SVR-4112 with 1 TB solid state drive or equal. The DVR shall be mounted as per the manufacturer's recommendations in the radio box behind the officer's seat. The DVR shall be set to record the outputs from the Thermal Imager and Digital Video Cameras whenever the vehicle's ignition switch is in the "on" position. Control of the DVR shall be through the CP7 monitor specified above. Software or cables required to view and save the video on a Windows-based computer shall also be supplied.

ELECTRICAL POWER SYSTEM

The primary power distribution shall be located forward of the officer's seating position and be easily accessible while standing on the ground for simplified maintenance and troubleshooting. Additional electrical distribution centers shall be provided throughout the vehicle to house the vehicle's electrical power, circuit protection, and control components. The electrical distribution centers shall be located strategically throughout the vehicle to minimize wire length. For ease of maintenance, all electrical distribution centers shall be easily accessible. All distribution centers containing fuses, circuit breakers and/or relays shall be easily accessible.

Distribution centers located throughout the vehicle shall contain battery powered studs for supplying customer installed equipment thus providing a lower cost of ownership.

Circuit protection devices, which conform to SAE standards, shall be utilized to protect electrical circuits. All circuit protection devices shall be rated per NFPA requirements to prevent wire and component damage when subjected to extreme current overload. General protection circuit breakers shall be Type-I automatic reset (continuously resetting). When required, automotive type fuses shall be utilized to protect electronic equipment. Control relays and solenoid shall have a direct current rating of 125 percent of the maximum current for which the circuit is protected per NFPA 1901.

215. SOLID-STATE CONTROL SYSTEM

A solid-state electronics based control system shall be utilized to achieve advanced operation and control of the vehicle components. A fully computerized vehicle network shall consist of electronic modules located near their point of use to reduce harness lengths and improve reliability. The control system shall comply with SAE J1939-11 recommended practices.

The control system shall operate as a master-slave system whereas the main control module instructs all other system components. The system shall contain patented Mission Critical software that maintains critical vehicle operations in the unlikely event of a main controller error. The system shall utilize a Real Time Operating System (RTOS) fully compliant with OSEK/VDX specifications providing a lower cost of ownership.

For increased reliability and simplified use the control system modules shall include the following attributes:

- Green LED indicator light for module power
- Red LED indicator light for network communication stability status
- Control system self-test at activation and continually throughout vehicle operation
- No moving parts due to transistor logic
- Software logic control for NFPA 1901 mandated safety interlocks and indicators
- Integrated electrical system load management without additional components
- Integrated electrical load sequencing system without additional components
- Customized control software to the vehicle's configuration
- Factory and field reprogrammable to accommodate changes to the vehicle's operating parameters

- Complete operating and troubleshooting manuals
- USB connection to the main control module for advanced troubleshooting
- To assure long life and operation in a broad range of environmental conditions, the solid-state control system modules shall meet the following specifications:
- Module circuit board shall meet SAE J771 specifications
- Operating temperature from -40C to +70C
- Storage temperature from -40C to +70C
- Vibration to 50g
- IP67 rated enclosure (Totally protected against dust and also protected against the effect of temporary water immersion in up to one (1) meter)
- Operating voltage from eight (8) volts to sixteen (16) volts DC

The main controller shall activate status indicators and audible alarms designed to provide warning of problems before they become critical.

216. CIRCUIT PROTECTION AND CONTROL DIAGRAM

Copies of all job-specific, computer network input and output (I/O) connections shall be provided with the vehicle. The sheets shall indicate the function of each module connection point, circuit protection information (where applicable), wire numbers, wire colors and load management information.

217. ON-BOARD ELECTRICAL SYSTEM DIAGNOSTICS

Advanced on-board diagnostic messages shall be provided to support rapid troubleshooting of the electrical power and control system. The diagnostic messages shall be displayed on the information center located at the driver's position.

The on-board information center shall include the following diagnostic information:

- Text description of active warning or caution alarms
- Simplified warning indicators
- Amber caution light with intermittent alarm
- Red warning light with steady tone alarm

218. ADVANCED DIAGNOSTICS

An advanced, Windows-based, diagnostic software program shall be provided for this control system. The software shall provide troubleshooting tools to service technicians equipped with a Windows-based computer.

The service and maintenance software shall be easy to understand and use and have the ability to view system input/output (I/O) information. Any cables or hardware required to connect the diagnostic system to a Windows-based laptop computer via USB or other standard connection shall be provided.

219. 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 either for a brief period when the vehicle is started or when manually requested by the vehicle operator.

220. 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.

221. ENHANCED SOFTWARE

The solid-state control system shall include the following software enhancements:

All perimeter lights and work lights shall be deactivated when the parking brake is released. The Whelen PCP2P 12 volt scene lights shall not be switched by this system.

Cab and crew cab dome lights shall remain on for ten (10) seconds for improved visibility after the doors close. The dome lights shall dim after ten (10) seconds; and immediately if the vehicle is put into gear.

Cab and crew cab perimeter lights shall remain on for ten (10) seconds for improved visibility after the doors close. The dome lights shall dim after ten (10) seconds; and immediately if the vehicle is put into gear.

The amber LEDs of the two cab-roof mounted mini light bars shall turn on when the vehicle’s ignition switch is on. These lights shall turn off when the emergency light master switch is activated, and turn on again when the emergency light master switch is turned off.

222. DEDICATED RADIO EQUIPMENT CONNECTION POINTS

There shall be three (3) studs provided in the primary power distribution center located in front of the officer for two-way radio equipment.

The studs shall consist of the following:

- 12-volt 40-amp battery switched power
- 12-volt 60-amp ignition switched power
- 12-volt 60-amp direct battery power

There shall also be a 12-volt 100-amp ground stud located in or adjacent to the power distribution center.

223. RADIOS

The following radios shall be provided and properly mounted in the cab according to the manufacturer's recommendations. **Appendix C** indicates the required model specifications for the 7/800 MHz radios in accordance with Rhode Island Emergency Management Agency. Specific locations of radios, control heads, and speakers shall be determined during the Preconstruction Conference.

Two (2) Motorola APX 6500 radios, both with the following options:

- Two (2) O5 standard control heads per radio (four [4] total), two mounted adjacent to the driver and two adjacent to the officer in the overhead panel area
- 800mHz frequency operation
- Software programming to comply with the State of Rhode Island's Rhode Island Statewide Communication System (RISCON) protocols and encryption (specific programming information to be provided to successful bidder)
- Each radio wired to a Motorola HAF 4016, 700/800mHz ¼ wave antennae, mounted as per Section 224 (two antennae total)
- Four (4) Motorola HMN1089 water resistant handheld microphones (one per control head)
- Two (2) Motorola HSN4040, 15 watt remote speakers, ceiling mounted in the cab behind the officer and driver's seats, one per radio.
- One radio shall be wired to the vehicle's switched battery power, the other radio shall be wired directly to the battery (not-switched).

One (1) Motorola APX 6500 radio with the following options:

- Two (2) O5 standard control heads, one mounted adjacent to the driver and one adjacent to the officer in the overhead panel area
- VHF frequency operation
- Software and associated cables to allow programming to be completed by the RIAC using a Windows-based computer
- Wired to a Motorola HAD 4008, VHF ¼ wave antennae, mounted as per Section 224
- Two (2) Motorola HMN1089 water resistant handheld microphones, one per control head
- One (1) Motorola HSN4040, 15 watt remote speaker, ceiling mounted in the cab behind the officer and driver's seats
- This radio shall be wired to the vehicle's switched battery power

Two (2) ICOM A220 VHF Air Band Transceivers with the following options:

- Both panel-mounted in the overhead panel area, one adjacent to the driver and one adjacent to the officer
- 8 watt transmitting power

- Each wired to an individual ICOM-recommended antenna, roof mounted as per Section 224
- One HM-176 hand microphone per radio
- One SP35 external speaker per radio, mounted adjacent to the radio
- Appropriate mounting brackets and hardware
- These radios shall be wired to the vehicle's switched battery power

Five (5) Motorola IMPRESS 12vDC vehicle chargers for Motorola XTS 2500 portable radios, model WPLN4208B, mounted in the cab as per the Preconstruction Conference. Chargers shall be wired to charge off of the 12vDC battery system, not off of switched power.

Two (2) Motorola APX 7000 Dual Band Portable Radios with the following options:

- Model 3.5, Dual Display
- VHF transmit and receive
- 800mHz transmit and receive
- Software programming to comply with the State of Rhode Island's Rhode Island Statewide Communication System (RISCON) protocols and encryption (specific programming information to be provided to successful bidder)
- IMPRES Li-Ion 4400 mAh -30ºC Rated, Submersible, Rugged Battery, model NNTN7034
- IMPRES RSM Windporting, Rugged external microphone, model PMMN4083

Two (2) Motorola IMPRESS 12vDC vehicle chargers for APX7000 portable radios, model NNTN7624, shipped loose

One (1) ICOM A6 portable aviation band transceiver with the following options, shipped loose.

- Battery pack, BP-210N or battery case, BP-208N*
- Belt clip, MB-103
- Carrying case, LC-159*
- Wall charger, BC-110AR/DR*
- Headset adapter, OPC-499*
- Antenna, FA-B02AR
- Handstrap

224. EMI/RFI PROTECTION

To prevent erroneous signals from crosstalk contamination and interference, the electrical system shall meet, at a minimum, SAE J551/2, thus reducing undesired electromagnetic and radio frequency emissions. An advanced electrical system shall be used to ensure radiated and conducted electromagnetic interference (EMI) or radio frequency interference (RFI) emissions are suppressed at their source.

The apparatus shall have the ability to operate in the electromagnetic environment typically found in fire ground operations to ensure clean operations. The electrical system shall meet, without exceptions,

electromagnetic susceptibility conforming to SAE J1113/25 Region 1, Class C EMR for 10 KHz-1GHz to 100 Volts/Meter. The vehicle OEM, upon request, shall provide EMC testing reports from testing conducted on an entire apparatus and shall certify that the vehicle meets SAE J551/2 and SAE J1113/25 Region 1, Class C EMR for 10 KHz-1GHz to 100 Volts/Meter requirements. Component and partial (incomplete) vehicle testing is not adequate as overall vehicle design can impact test results and thus is not acceptable by itself.

EMI/RFI susceptibility shall be controlled by applying appropriate circuit designs and shielding. The electrical system shall be designed for full compatibility with low-level control signals and high-powered two-way radio communication systems. Harness and cable routing shall be given careful attention to minimize the potential for conducting and radiated EMI/RFI susceptibility.

Two mounting plates shall be provided on the cab roof for the mounting of six antennae (three antennae each) for the following radios:

- Two (2) antennae for ICOM AC-220 aviation band radios, 8 watts (one per mounting plate)
- Four (4) Motorola APX 6500 radios
    - Two (2) Motorola HAD 4008, VHF ¼ wave antennae, 150.8-162 MHz at 50 watts (one per mounting plate)
    - Two (2) Motorola HAF 4016, 700/800mHz ¼ wave antenna, 762-870mHz at 35 watts (one per mounting plate)

225. BATTERY SYSTEM

There shall be six (6) 12 volt Exide, Model 31S950X3W, batteries that include the following features provided:

- 950 CCA, cold cranking amps
- 190 amp reserve capacity
- High cycle
- Group 31
- Rating of 5700 CCA at 0 degrees Fahrenheit
- 140 minutes of reserve capacity
- Threaded stainless steel studs

Each battery case shall be a black polypropylene material with a vertically ribbed container for increased vibration resistance. The cover shall be manifold vented with a central venting location to allow a 45 degree tilt capacity.

The inside of each battery shall consist of a "maintenance free" grid construction with poly wrapped separators and a flooded epoxy bottom anchoring for maximum vibration resistance.

226. BATTERY SYSTEM - STARTER

There shall be a single starting system with an ignition switch and starter button provided and located on the cab instrument panel.

227. MASTER BATTERY SWITCH

There shall be a master battery switch provided within the cab within easy reach of the driver from both a seated position and from a standing position on the ground outside of the vehicle to activate the battery system.

An indicator light shall be provided on the instrument panel to notify the driver of the status of the battery system.

228. BATTERY COMPARTMENTS

The batteries shall be stored in well-ventilated compartments that are located under the cab and bolted directly to the chassis frame. The battery compartments shall be constructed of 3/16" steel plate and be designed to accommodate a maximum of three (3) group 31 batteries in each compartment. The compartments shall include formed fit heavy-duty roto-molded polyethylene battery tray inserts with drains on each side of the frame rails. The batteries shall be mounted inside of the roto-molded trays.

229. JUMPER STUDS

One (1) set of battery jumper studs with plastic color-coded covers shall be installed on the battery box on the driver's side. This shall allow enough room for easy jumper cable access.

230. ADDITIONAL JUMPER STUDS

One (1) set of battery jumper studs with plastic color coded covers shall be recessed in the side of the bumper extension on the driver's side. This shall be an open compartment, just large enough for jumper cable access. A tag shall be provided for positive/negative terminals. The plastic covers shall have a cable or chain to retain them on the truck in case of accidental removal or dislodgment.

231. BATTERY CHARGER / AIR COMPRESSOR

A Kussmaul Pump Plus 1000 Model 091-9-1000, 18 amp single output battery charger/air compressor system with internal battery saver shall be provided. There shall be a display bar graph indicating the state of charge included.

The battery saver circuit shall be capable of supplying up to three (3) amps for external loads such as hand light or auxiliary radio batteries.

The 12-volt air compressor shall be installed to maintain the air system pressure when the vehicle is not in use.

The battery charger shall be wired to the AC shoreline inlet through an AC receptacle adjacent to this battery charger.

Battery charger/compressor shall be located behind the driver's seat.

The battery charger indicator shall be located in the driver's step area.

232. AUTO EJECT FOR ELECTRICAL SHORELINE

There shall be one (1) Kussmaul Model 091-20WP-120, 20 amp 120 volt AC shoreline inlet provided to operate the dedicated 120 volt AC circuits on the apparatus.

The shoreline inlet shall include a yellow weatherproof flip up cover, with automatic spring closure.

There shall be a release solenoid wired to the vehicle's starter to eject the AC connector when the engine is starting.

The shoreline shall be connected to the battery charging system.

There shall be a mating connector body supplied with the loose equipment.

There shall be a label installed near the inlet(s) that state the following:

- Line Voltage
- Current Ratting (amps)
- Phase
- Frequency

An indicator lamp in the vicinity of the shoreline inlet shall illuminate when the shoreline is plugged in to live external power. The charger indicator shall be acceptable if it is a lighted monitor.

The shoreline receptacle shall be located on the left (driver's) side above the front wheel well.

The shoreline receptacle shall power the 120vAC receptacles in the cab listed in Section 409.

233. ALTERNATOR

A C.E. Niehoff, model C680-1, alternator shall be provided. It shall have a rated output current of 430 amp as measured by SAE method J56. Also, it shall have a custom three (3)-set point voltage regulator, manufactured by C. E. Niehoff. The alternator shall be connected to the power and ground distribution system with heavy-duty cables sized to carry the full rated alternator output.

234. ELECTRONIC LOAD MANAGER

An electronic load management (ELM) system shall be provided that monitors the vehicle’s 12-volt electrical system, automatically reducing the electrical load in the event of a low voltage condition, and automatically restoring the shed electrical loads when a low voltage condition expires. This ensures the integrity of the electrical system.

For improved reliability and ease of use, the load manager system shall be an integral part of the vehicle's solid state control system requiring no additional components to perform load management tasks. Load management systems which require additional components shall not be allowed.

The system shall include the following features:

- System voltage monitoring.
- A shed load shall remain inactive for a minimum of five minutes to prevent the load from cycling on and off.
- Sixteen available electronic load shedding levels.
- Priority levels can be set for individual outputs.
- High Idle to be controlled by the load manager.
    - If enabled:
        - "Load Man Hi-Idle On" shall display on the information center.
        - Hi-Idle shall not activate until 30 seconds after engine start up.
- Individual switch "on" indicator to flash when the particular load has been shed.
- The information center indicates system voltage.
- The information center, where applicable, includes a "Load Manager" screen indicating the following:
- Load managed items list, with priority levels and item condition.
- Individual load managed item condition:
    - ON = not shed
    - SHED = shed

235. 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.

For improved reliability and ease of use, the load sequencing system shall be an integral part of the vehicle's solid state control system requiring no additional components to perform load sequencing tasks. Load sequencing systems which require additional components shall not be allowed.

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.

Sequencing of the following items shall also occur, in conjunction with the ignition switch, at half-second intervals:

- Cab Heater and Air Conditioning
- Crew Cab Heater
- Crew Cab Air Conditioning
- Third Evaporator (if applicable)
-

236. HEADLIGHTS

There shall be two (2) Brightheadlight, kit number Bi-XP5006-Kit, round HID lights mounted in the front trim housing on each side of the cab grille:

The outside light on each side shall contain an HID low and a halogen high beam module.

The inside light on each side shall contain a halogen high beam module only.

237. CAB DIRECTIONAL LIGHTS

There shall be two (2) Whelen 600 series, LED combination directional/marker lights provided. The lights shall be located on the outside cab corners, next to the headlights.

The color of the lenses shall be the same color as the LED's.

238. CAB CLEARANCE/MARKER/ID LIGHTS

There shall be seven (7) amber LED lights provided to indicate the presence and overall width of the vehicle in the following locations:

• Three (3) amber LED identification lights shall be installed in the center of the cab above the windshield.

• Two (2) amber LED clearance lights shall be installed, one (1) on each outboard side of the cab above the windshield.

• Two (2) amber LED marker lights shall be installed, one (1) on each side above the cab doors.

239. BACK-UP ALARM

A Preco, Model 100 series, solid-state electronic audible back-up alarm that actuates when the truck is shifted into reverse shall be provided. The device shall sound at 60 pulses per minute and automatically adjust its volume to maintain a minimum ten (10) dBA above surrounding environmental noise levels.

VEHICLE BODY

240. WATER TANK

The water tank shall have a minimum capacity of 1000 gallons and be constructed of UV stabilized ultra-high impact polypropylene plastic by a manufacturer with a minimum of 20 years' experience building tanks, is ISO 9001:2000 certified in all its manufacturing facilities, and has over 50,000 tanks in service.

Bid Option: A water tank of 1250 gallons capacity is preferred over the 1000 gallon tank, however it is understood that weight considerations may preclude the 1250 gallon tank. If bidders are capable of providing a 1250 gallon water tank that does not risk overloading the vehicle, they are asked to provide prices for a vehicle with a 1000 and vehicle with a 1250 gallon water tank on the Bidder Response Form Item 4.

Tank shall have a Tee shape, maximizing both the amount of water carried and the available compartment space.

Tank joints and seams shall be nitrogen welded inside and out.

Tank shall be baffled in accordance with NFPA 1901 requirements.

Baffles shall have vent openings at both the top and bottom to permit movement of air and water between compartments.

Longitudinal partitions shall be constructed of .38" polypropylene plastic and shall extend from the bottom of the tank through the top cover to allow for positive welding.

Transverse partitions shall extend from 4.00" off the bottom of the tank to the underside of the top cover.

All partitions shall interlock and shall be welded to the tank bottom and sides.

Tank top shall be constructed of .50" polypropylene. It shall be recessed .38" and shall be welded to the tank sides and the longitudinal partitions.

Tank top shall be sufficiently supported to keep it rigid during fast filling and emptying conditions. The tank shall be capable of being filled or emptied at a rate of 1000 gallons per minute.

Construction shall include 2.00" polypropylene dowels spaced no more than 30.00" apart and welded to the transverse partitions. Two (2) of the dowels shall be drilled and tapped (.50" diameter, 13.00" deep) to accommodate lifting eyes.

A sump that is at least 8.00" long x 8.00" wide x 6.00" deep shall be provided at the bottom of the water tank.

Sump shall include a drain plug and the tank outlet.

Tank shall be installed in a fabricated cradle assembly constructed of structural steel.

Sufficient cross members shall be provided to properly support bottom of tank. Cross members shall be constructed of steel flat bar or rectangular tubing.

Tank shall "float" in a cradle to avoid torsional stress caused by chassis frame flexing. Rubber cushions, .50" thick x 3.00" wide, shall be placed on all horizontal surfaces that the tank rests on. Stops or other provision shall be provided to prevent an empty tank from bouncing excessively while moving the vehicle.

Mounting system shall be approved by the tank manufacturer.

The fill tower shall be constructed of .50" polypropylene and shall be a minimum of 8.00" wide x 14.00" long, and shall be furnished with a .25" thick removable polypropylene screen and a hinged cover.

An overflow pipe, constructed of 4.00" schedule 40 polypropylene, shall be installed approximately halfway down the fill tower and extend through the water tank and exit to the rear of the rear axle.

Two (2) sleeves shall be provided in the water tank for a 3.00" pipe each to the rear.

Should any drilling, cutting, or other work that leaves any type of residue be done on the water tank, the inside of the tank, including the sump and any screens or filters, shall be thoroughly inspected to ensure that it is free of cuttings, shavings, turnings, chips, or any other materials that may clog or damage the water system.

241. DIRECT TANK FILL

There shall be one (1) - 2.50" gated external tank fill(s) installed and properly labeled at the rear of the truck, located passenger's side, with the valve installed as low as practical for easy hose connection.

Piping for the fill shall be routed through the rear wall of the tank and include a flow deflector to break up the stream of water entering the water tank.

A 2.50" full flow ball valve with 2.50" piping and a 2.50" female National Standard chrome swivel shall be located at the inlet.

A 2.50" male National Standard x 5.00" Storz, hard coat aluminum 30 degree elbow adapter shall be provided at the tank fill. A 5.00" Storz x 4.00" Storz adapter with a 4.00" blind cap and chain shall also be provided for the tank fill.

The direct tank fill plumbing shall be capable of supporting a 5.00” hose, full of water, suspended from the fill connection and sloping, unsupported, towards the ground at a 45 degree angle while flowing 750 gpm, without pulling, twisting, rotating, or otherwise damaging the tank fill connection.

If the manufacturer specifies a maximum pressure, less than 80 psi, that the direct tank fill may be utilized at, a 2.00" pressure gauge, manufactured by Class 1 with a white face with black markings, a Zytel nylon case with adhesive mounting gasket and threaded retaining nut, and a pressure rating of 0-400 psi. shall

be installed adjacent to the direct tank fill connection and valve to sense the pressure in the tank fill line. The gauge shall include a 10 year warranty against leakage, pointer defect, and defective bourdon tube.

242. BODY DIMENSIONS

The height of the body shall be 95.00" from the bottom of the body to the top of the body.

The width of the body shall be substantially equal to the external width of the vehicle cab.

243. HOSE BED

The hose bed shall be fabricated of corrosion resistant, low carbon austenitic, brushed and painted 304L stainless steel. Due to superior corrosion resistance of 300 stainless grades, other grades of austenitic stainless steels, or any grade of ferritic or martensitic stainless, shall not be acceptable.

Flooring of the hose bed shall be removable aluminum grating with the top surface corrugated to aid in air flow around the hose. The grating slats shall be a minimum of 0.50" x 4.50" with spacing between slats for hose ventilation.

Two hinged hose bed covers shall be provided to protect the hose. One cover shall hinge upwards from the left side of the hose bed, and the other cover shall hinge upwards from the right side of the hose bed. Each cover shall cover roughly half the width of the hose bed, meeting in the center of the truck to cover the hose bed in its entirety when closed. The covers shall be constructed of 304L stainless steel, with a tread-plate walking surface above. The covers shall be capable of supporting personnel on the top of the vehicle. Spring or self-contained hydraulic struts shall be provided to assist in lifting the covers to their open position. Locks or other devices shall be provided to maintain the hose bed covers in their open position without accidentally falling closed.

The hose bed shall accommodate the following:

- 1000' of 5.00" Large Diameter Hose in 100’ coupled lengths
- 500' of 3.00" double jacket hose in 50’ coupled lengths
- 300' of 2.50" double jacket hose in 50’ coupled lengths with a TFT Dual Force nozzle

244. HOSE BED DIVIDERS

Two (2) adjustable hose bed dividers shall be furnished for separating hose.

Each divider shall be constructed of a .125" brushed aluminum sheet fitted and fastened into a slotted, 1.50" diameter radiused extrusion along the top, bottom, and rear edge.

Divider shall be fully adjustable by sliding in tracks, located at the front and rear of the hose bed.

Divider shall be held in place by tightening bolts, at each end.

Acorn nuts shall be installed on all bolts in the hose bed which have exposed threads.

245. HOSE BED HOSE RESTRAINT

The hose in the hose bed shall be restrained by a black nylon strap at the rear of the hose bed, 2.00" black nylon webbing with a 1.50" x 4.00" box pattern shall attach at the top rear outside corners with 2.00" cam buckle fasteners. The webbing shall have straps connected with 2.00" cam buckle fasteners located at the rear body sheet below the hose bed.

246. RUNNING BOARDS

Design of the vehicle shall be such that running boards shall not be required to reach pre connects or other items on the side of the vehicle.

247. TAILBOARD

The tailboard shall be constructed of .125" bright aluminum tread plate and spaced .50" from the body, as well as supported by a structural steel assembly.

The tailboard area shall be 14.00" deep and full width of the body. The outboard sides of the tailboard shall be angled at 45 degrees beginning at the point where the body meets the tailboard at the forward outboard edge angling rearward to the rear edge of the tailboard.

The exterior side shall be flanged down and in for increased rigidity of tailboard structure.

The tailboard shall be capable of supporting at least 1000 lbs. in totality, with 400 pound per square foot capacity at any point on the step surface.

248. REAR WALL, BODY MATERIAL

The rear wall shall be smooth and the same material as the body.

The rear wall body material shall be painted. Unpainted aluminum overlays shall be provided to allow for chevron application and to provide continuously smooth rear wall panels.

The outboard edges of the rear wall shall be trimmed in polished stainless steel.

A brushed, unpainted, 304L stainless steel panel shall be provided for the mounting of a Task Force Tips Blitzfire OSC monitor in a TFT model XX-B storage bracket, with hose preconnected to the rear hose bed. The panel shall provide abrasion resistance to prevent damage to the rear chevrons or other finish. The specific location of this panel shall be determined at the Preconstruction Conference.

249. TOW BAR

A tow bar assembly shall be installed under the tailboard at center of truck. When force is applied to the bar, it shall be transmitted to the frame rail.

The tow bar assembly shall be designed and positioned to allow up to a 30-degree upward angled pull of at least 17,000 lb., and a minimum 20,000 lb. straight horizontal pull in line with the centerline of the vehicle.

The tow bar design shall have been fully tested and evaluated using strain gauge testing and finite element analysis techniques.

250. BODY

The apparatus body shall be built of corrosion resistant, low carbon austenitic, brushed and painted 304L stainless steel. Due to superior corrosion resistance of 300 stainless grades, other grades of austenitic stainless steels, any grade of ferritic or martensitic stainless, or aluminum shall not be acceptable.

The body panel assembly shall be constructed in a fixture and consist of formed sheet metal for the front and rear bulkheads, door frames, floors, ceilings, and back walls. These parts shall be welded together to ensure greatest longevity with no visible welds in compartment interior.

Welded construction shall consist of .38" engineered plug weld holes that control the size, location, and the amount of weld required. The bodies shall be assembled and welded from engineered prints that call out the size, location, and type of weld required.

In structural areas the sheet metal components shall have flanges for welding. No butt joints shall be allowed. Gussets and support posts shall be provided for additional strength where needed.

The fender panel shall be an integral part of the complete welded body assembly. All light and compartment holes shall be pre punched prior to construction to provide accuracy and rounded corners to prevent stress cracking in the material.

Circular fender liners shall be provided. For prevention of paint chips and ease of suspension maintenance the fender liners shall be formed from brush finished 304L stainless steel, be unpainted, and removable for suspension maintenance.

Compartment flooring shall be of the sweep out design with the floor 1.00" higher than the compartment door lip.

Drip protection shall be provided above the doors by means of aluminum extrusion.

The area above the compartments shall house the hatch compartments. The floor of the hatch compartments shall not be utilized as the ceiling of the lower compartments.

All screws and bolts, which are not Grade 8, shall be stainless steel and where they protrude into a compartment shall have acorn nuts on the ends to prevent injury.

251. UNDERBODY SUPPORT SYSTEM

Due to the severe loading requirements of this vehicle, a method of body and compartment support suitable for the intended load shall be provided.

The body support system shall begin with the chassis frame rails which shall be designed for sustaining maximum loads. The support system shall include lateral frame rail extensions that are formed from .375" 80k high strength steel and bolted to the chassis frame rails with .625" minimum diameter Grade 8 bolts. Bolts shall be properly torqued. Thread locking adhesive shall be applied as needed to prevent inadvertent loosening of bolts.

The vertical and horizontal members of the frame rail extensions are to be reinforced with welded gussets and extend to the outside edge of the body. The lateral frame extensions shall be electro-coated for superior corrosion resistance.

The floating substructure shall be separated from the lateral frame extensions with neoprene elastomer isolators. These isolators shall reduce the natural flex stress of the chassis from being transmitted to the body, and absorb road shock and vibration.

The isolators shall have a broad load range, proven viability in vehicular applications, be of a fail-safe design and allow for all necessary movement in three (3) transitional and rotational modes.

The neoprene isolators shall be installed in a modified V three (3)-point mounting pattern to reduce the natural flex of the chassis being transmitted to the body. Two (2) 3.50" diameter isolators are provided at the front of the body near the centerline of the vehicle above the chassis frame. A minimum of twelve (12) - 2.55" diameter isolators shall be provided, two (2) under each front compartment and two (2) under each rear side compartment. A minimum of four (4) 3.50" diameter isolators shall be provided under the rear compartment.

A design with body compartments simply hanging/sitting on the chassis in an unsupported (cantilever) fashion shall not be acceptable.

To assist in the design of the compartment support structure, a list of anticipated equipment to be stored in the compartments is provided in Appendix A. This list does not comprise the totality of equipment to be stored; the minimum carrying capacities of the compartments found in this specification and in NFPA 1901 shall apply if greater than the weight of the listed equipment.

252. AGGRESSIVE WALKING SURFACES

All exterior surfaces designated as stepping, standing, and walking areas shall comply with the required average slip resistance of the current NFPA standards. Documentation of the material meeting the standard shall be provided at time of delivery.

253. LOUVERS

All body compartments, excepting the compartment listed below, shall have a minimum of one (1) set of automotive style, dust resistant louvers pressed into a wall. The louvers shall incorporate a one (1)-way rubber valve that provides airflow out of the compartment and prevents water and dirt from gaining access to the compartment.

Compartments over the rear wheels shall not have louvers.

Compartment Passenger 3 (in front of the rear wheel) shall not have louvers that connect into any other compartment. Louvers that vent to another area are acceptable, provided that road dirt, debris, and moisture do not enter the compartment through the louver(s).

254. TESTING OF BODY DESIGN

Body structural analysis shall be fully tested. Proven engineering and test techniques, such as finite element analysis and strain gauging, shall have been performed showing successful design and construction. Special attention given shall be given to fatigue life, and structural integrity of the body and substructure.

The body shall be tested while loaded to its greatest in-service weight.

The criteria used during the testing procedure shall include:

- Raising opposite corners of the vehicle tires 9.00" to simulate the twisting a truck may experience when driving over a curb.
- Making a 90 degree turn, while driving at 20 mph to simulate aggressive driving conditions.
- Driving the vehicle on at 35 mph on a washboard road.
- Driving the vehicle at 55 mph on a smooth road.
- Accelerating the vehicle fully, until reaching the approximate speed of 45 mph on rough pavement.

Evidence of the actual testing techniques shall be made available upon request.

Finite Element Analysis, with successful results, shall have been performed on all substructure components.

255. COMPARTMENTS, DRIVER'S SIDE

A full height, roll-up door compartment near the front of the body, ahead of the rear wheels shall be provided. The pump operator's panel shall be located in this compartment. The interior dimensions of this compartment shall be 31.00" wide x 53.50" high x 25.88" deep, minus the area utilized for the ground ladder storage tunnel. The area behind the roll up door spool shall be notched for exterior storage or larger capacity water tank tee. The depth of the compartment shall be calculated with the compartment door closed. The compartment interior shall be fully open from the compartment ceiling to the compartment

floor and designed so that no permanent dividers are required between the upper and lower sections. The clear door opening of this compartment shall be 28.00" wide x 53.50" high.

A full height, roll-up door compartment immediately ahead of the rear wheels shall be provided. The interior dimensions of this compartment shall be 50.50" wide x 54.50" high x 25.88" deep, minus the area utilized for the ground ladder storage tunnel. The area behind the roll up door spool shall be notched for exterior storage or larger capacity water tank tee. The depth of the compartment shall be calculated with the compartment door closed. The compartment interior shall be fully open from the compartment ceiling to the compartment floor and designed so that no permanent dividers are required between the upper and lower sections. The clear door opening of this compartment shall be 47.50" wide x 54.50" high.

Closing of the door shall not require releasing, unlocking, or unlatching any mechanism and shall easily be accomplished with one hand.

A roll-up door compartment over the rear wheels shall be provided. The interior dimensions of this compartment shall be 60.00" wide x 22.75" high x 25.88" deep, minus the area utilized for the ground ladder storage tunnel. The area behind the roll up door spool shall be notched for exterior storage or larger capacity water tank tee. The depth of the compartment shall be calculated with the compartment door closed. The clear door opening of this compartment shall be 57.00" wide x 22.75" high.

Closing of the door shall not require releasing, unlocking, or unlatching any mechanism and shall easily be accomplished with one hand.

A full height, roll-up door compartment behind the rear wheels shall be provided. The interior dimensions of this compartment shall be 52.00" wide x 54.50" high x 25.88" deep. The area behind the roll up door spool shall be notched for exterior storage or larger capacity water tank tee. The depth of the compartment shall be calculated with the compartment door closed. The compartment interior shall be fully open from the compartment ceiling to the compartment floor and designed so that no permanent dividers are required between the upper and lower sections. The clear door opening of this compartment shall be 49.00" wide x 54.50" high.

Closing of the door shall not require releasing, unlocking, or unlatching any mechanism and shall easily be accomplished with one hand.

All compartments shall include a drip pan below the roll of the door, as well as a stainless steel edge rolled over the compartment opening lip to prevent damage from equipment being placed into or removed from the compartment.

256. COMPARTMENTS, PASSENGER'S SIDE

A full height compartment with a roll-up door near the front of the body, ahead of the rear wheels shall be provided, as convenient large storage compartment for often used items for the crew. The interior dimensions of this compartment shall be 42.00" wide x 54.50" high x 25.88" deep. The area behind the roll up door spool shall be notched for exterior storage or larger capacity water tank tee. The depth of the compartment shall be calculated with the compartment door closed. The compartment interior shall be fully open from the compartment ceiling to the compartment floor and designed so that no permanent

dividers are required between the upper and lower sections. The clear door opening of this compartment shall be 39.00" wide x 54.50" high.

A full height, roll-up door compartment immediately ahead of the rear wheels shall be provided. The interior dimensions of this compartment shall be 42.00" wide x 54.50" high x 25.88" deep. The area behind the roll up door spool shall be notched for exterior storage or larger capacity water tank tee. The depth of the compartment shall be calculated with the compartment door closed. The compartment interior shall be fully open from the compartment ceiling to the compartment floor and designed so that no permanent dividers are required between the upper and lower sections. The clear door opening of this compartment shall be 39.00" wide x 54.50" high.

Closing of the door shall not require releasing, unlocking, or unlatching any mechanism and shall easily be accomplished with one hand.

A roll-up door compartment over the rear wheels shall be provided. The interior dimensions of this compartment shall be 60.00" wide x 23.00" high x 25.88" deep. The area behind the roll up door spool shall be notched for exterior storage or larger capacity water tank tee. The depth of the compartment shall be calculated with the compartment door closed. The clear door opening of this compartment shall be 57.00" wide x 23.00" high.

Closing of the door shall not require releasing, unlocking, or unlatching any mechanism and shall easily be accomplished with one hand.

A full height, roll-up door compartment behind the rear wheels shall be provided. The interior dimensions of this compartment shall be 52.00" wide x 54.50" high x 25.88" deep. The depth of the compartment shall be calculated with the compartment door closed. The compartment interior shall be fully open from the compartment ceiling to the compartment floor and designed so that no permanent dividers are required between the upper and lower sections. The clear door opening of this compartment shall be 49.00" wide x 54.50" high.

A cut-out at the top of this compartment penetrating into the passenger’s side hatch compartment, behind the rollup door mechanism, may be permitted to allow vertical storage of long rescue struts, provided the cutout does not interfere with the operation of any other mechanism or system.

Closing of the door shall not require releasing, unlocking, or unlatching any mechanism and shall easily be accomplished with one hand.

All compartments shall include a drip pan below the roll of the door, as well as a stainless steel edge rolled over the compartment opening lip to prevent damage from equipment being placed into or removed from the compartment.

257. UNDERBODY STORAGE COMPARTMENTS

Two underbody slide-out storage compartments shall be provided in front of the rear wheels, one on the left side and one on the right side. The storage compartments shall each have a weight capacity of at least 250 pounds, and shall be sized to hold one Vetter/Paratech low pressure high lift airbag each. The clear

storage space shall be at least 6.00” high and 50.00” by 50.00”. Each compartment shall be constructed of stainless steel and be fully enclosed on the sides and bottom. The compartments shall each be held closed by two recessed D-handles. The exterior face of the compartments shall be a bright diamond plate material.

Other arrangements for storage of the airbags may be entertained at the discretion of RIAC if the manufacturer prefers not to utilize the underbody storage system.

258. ROLLUP DOORS, SIDE COMPARTMENTS

There shall be eight (8) compartment doors installed on the side compartments, double faced, aluminum construction, painted one (1) color to match the lower portion of the body, and manufactured by Amdor brand rollup doors.

Door(s) shall be constructed using 1.00" extruded double wall aluminum slats which will feature a flat smooth interior surface to provide maximum protection against equipment hang-up. The slats shall be connected with a structural driven ball and socket hinge designed to provide maximum curtain diaphragm strength. Mounting and adjusting the curtain shall be done with a clip system that connects the curtain to the balancer drum allowing for easy tension adjustment without tools. The slats shall be mounted in reusable slat shoes with positive snap-lock securement.

Each slat will incorporate weather tight recessed dual durometer seals. One (1) fin will be designed to locate the seal within the extrusion. The second will serve as a wiping seal which will also allow for compression to prevent water ingression.

The doors shall be mounted in a one (1)-piece aluminum side frame with recessed side seals to minimize seal damage during equipment deployment. All seals including side frames, top gutters and bottom panel are to be manufactured utilizing non-marring materials.

Bottom panel flange of rollup door will be equipped with two (2) cut-outs to allow for easier access with gloved hands.

A stainless steel lift bar to be provided for opening the door and located at the bottom of each door with latches on the outer extrusion of the door frame. A ledge is to be supplied over lift bar for additional area to aid in closing the door. The lift bar shall be located at the bottom of door with striker latches installed at the base of the side frames. Side frame mounted door strikers will include support beneath the stainless steel lift bar to prevent door curtain bounce, improve bottom seal life expectancy and to avoid false door ajar signals.

All injection molded rollup door wear components will be constructed of Type 6 nylon.

Each rollup door shall have a 3.00 inch diameter balancer/tensioner drum to assist in lifting the door. A garage door style shall not acceptable.

The header for the rollup door assembly shall not exceed 4.00".

A heavy-duty magnetic switch shall be used for control of open compartment door warning lights. Contact-type momentary switches shall not be used for the compartment open warning light system, due to frequent faults with this type of switch.

259. HATCH COMPARTMENTS

Hatch compartments with two (2) lift-up, top opening hatch doors shall be provided above the driver and passenger side body compartments. Each hatch compartment shall extend the full length of the side body compartmentation x 21.00" wide x 22.00" maximum depth. The compartments shall extend the full length of the side body compartmentation except for a 20.00" recessed step area at the rear of the compartment on the passenger side for the access ladder.

Sides of the compartments shall be constructed of the same material as the body and painted job color on the outside panels.

Top of the compartments shall be constructed of bright aluminum tread plate.

Two (2) lift-up, bright aluminum tread plate doors shall be provided on the top of each hatch compartment. Each door shall have a lever handle with a slam style latch to hold the doors in the closed position.

These double pan doors shall have lipped edges with a rubber seal for weather resistance.

Doors shall be hinged on the outboard side and shall be held open with pneumatic stay arms.

The compartments shall have a 3/4" drain that extends to below the body.

Ribbed rubber matting shall be provided on the compartment floor to stop wet equipment from sitting in water pools.

Three (3) dividers within each compartment shall be provided, located as per the Preconstruction Conference.

260. COMPARTMENT, REAR

A compartment above the rear tailboard shall be provided.

Interior dimensions of this compartment shall be approximately 36.75" wide x 42.38" high x 25.88" deep in the lower 33.75" of height and 15.75" deep in the remaining upper portion. Depth of the compartment shall be calculated with the compartment door closed.

A removable access panel shall be furnished on the back wall of the compartment to access components inside the vehicle.

Rear compartment shall be open to the rear side compartments. The transverse opening shall be a minimum of approximately 22.00" wide x 28.75" high.

Clear door opening of this compartment shall be 33.50" wide x 33.75" high.

Closing of the door shall not require releasing, unlocking, or unlatching any mechanism and shall easily be accomplished with one hand.

261. ROLL-UP DOOR, REAR COMPARTMENT

The rear compartment shall have a roll-up door.

The door shall be double faced, aluminum construction, satin aluminum and manufactured by Amdor brand roll-up doors.

The door shall be constructed using 1.00" extruded double wall aluminum slats which shall feature a flat smooth interior surface to provide maximum protection against equipment hang-up. The slats shall be connected with a structural driven ball and socket hinge designed to provide maximum curtain diaphragm strength. Mounting and adjusting the curtain shall be done with a clip system that connects the curtain to the balancer drum allowing for easy tension adjustment without tools. The slats shall be mounted in reusable slat shoes with positive snap-lock securement.

Each slat shall incorporate weather tight recessed dual durometer seals. One (1) fin shall be designed to locate the seal within the extrusion. The second shall serve as a wiping seal which shall also allow for compression to prevent water ingression.

The door shall be mounted in a one (1)-piece aluminum side frame with recessed side seals to minimize seal damage during equipment deployment. All seals including side frames, top gutters and bottom panel are to be manufactured utilizing non-marring materials.

The bottom panel flange of roll-up door shall be equipped with two (2) cut-outs to allow for easier access with gloved hands.

A stainless steel lift bar to be provided for opening the door and located at the bottom of each door with latches on the outer extrusion of the door frame. A ledge is to be supplied over lift bar for additional area to aid in closing the door. The lift bar shall be located at the bottom of door with striker latches installed at the base of the side frames. Side frame mounted door strikers shall include support beneath the stainless steel lift bar to prevent door curtain bounce, improve bottom seal life expectancy and to avoid false door ajar signals.

All injection molded roll-up door wear components shall be constructed of Type 6 nylon.

The door shall have a 3.00 inch diameter balancer/tensioner drum to assist in lifting the door. Garage door style balancers shall not acceptable.

The header for the roll-up door assembly shall not exceed 4.00".

A heavy-duty magnetic switch shall be used for control of open compartment door warning lights. Contact-type momentary switches shall not be used for the compartment open warning light system, due to frequent faults with this type of switch.

262. PULL STRAPS

There shall be ten (10) compartment doors provided with pull straps. The compartments door to be provided with a pull strap shall be:

- Each body roll-up door
- Crosslay roll-up doors
- A strap is not required on the rear roll-up door.

263. COMPARTMENT LIGHTING

There shall be nine (9) compartment(s) with two (2) LED compartment light strips. The dual light strips shall be centered vertically along each side of the door framing. There shall be two (2) light strips per compartment, mounted on the inside edge of each equipment compartment adjacent to the door. All body compartments, with the exception of the two crosslay end compartments, shall be equipped with the strip lights.

Opening the compartment door shall automatically turn the compartment lighting on. Contact-type momentary switches shall not be used to turn on the compartment lights, due to frequent faults with this type of switch

Metal clamps shall be used to retain the strip lighting in all body compartments.

264. HATCH COMPARTMENT LIGHTING

There shall be LED strip lights mounted full length on the interior, hinged side of each compartment.

Opening the hatch compartment door shall automatically turn the hatch compartment lighting on.

265. COMPARTMENT SHELVING MOUNTING TRACKS

There shall be recessed tracks installed vertically in each compartment to support adjustable shelves.

Tracks shall not protrude into any compartment in order to provide the greatest compartment space and widest shelves possible.

The tracks shall be provided in each compartment, except for the one that contains the pump operator's panel.

266. FIXED AND ADJUSTABLE SHELVES

Shelves with a capacity of 215 lb. shall be provided, in quantities and locations as described below. The shelf construction shall consist of .18" aluminum with 1.00" back and sides and minimum flange on front. The shelf shall have square corners that are welded. Each shelf shall be painted to match the compartment interior. Each shelf shall be infinitely adjustable by means of a threaded fastener, which slides in a track.

The shelves shall be held in place by .12" thick stamped plated brackets and bolts.

The following quantities shall be provided for the following locations (compartments are labeled starting at the rear of the vehicle and moving forward):

Driver's Side 1: One (1) adjustable shelf.

Driver's Side 2: No fixed or adjustable shelving.

Driver's Side 3:

- Center, vertical fixed divider running from the floor of the compartment to the ceiling, with shelving mounting track on the right side.
- One fixed shelf at bottom of the compartment, and three (3) adjustable shelves connecting the center divider to the right (aft) wall of the compartment

Driver's Side 4: No shelving (pump panel compartment).

Passenger's Side 1: Airbag, stabilization, and rescue strut storage system (described later).

Passenger's Side 2: No fixed or adjustable shelving.

Passenger's Side 3: Two (2) adjustable shelves, notched to allow storage of drain cover tubes (see Appendix A)

Passenger's Side 4: Two (2) adjustable shelves.

Rear Compartment: One (1) Adjustable shelf.

Any shelving, tray, or bracket that has removable pins shall have a cable, chain, or other means for preventing loss of the removable pin. The cable, chain, or other means shall be of sufficient length to allow the pin to be removed, but will not allow the pin to fall to the ground.

267. SLIDE-OUT FLOOR MOUNTED TRAY

There shall be two (2) floor mounted slide-out trays with 2.00" sides provided as described below. Each tray shall be rated for up to 500lb in the extended position. The trays shall be constructed of .19" aluminum with welded corners. The finish shall be painted to match compartment interior.

There shall be two under mount-roller bearing type slides rated at 250lb each provided. The pair of slides shall have a safety factor rating of 2.

To ensure years of dependable service, the slides shall be coated with a finish that is tested to withstand a minimum of 1,000 hours of salt spray per ASTM B117.

To ensure years of easy operation, the slides shall require no more than a 50lb force for push-in or pull-out movement when fully loaded after having been subjected to a 40 hour vibration (shaker) test under full load. The vibration drive file shall have been generated from accelerometer data collected from a heavy truck chassis driven over rough gravel roads in an unloaded condition. Proof of compliance shall be provided upon request.

Automatic locks shall be provided for both the "in" and "out" positions. The trip mechanism for the locks shall be located at the front of the tray for ease of use with a single gloved hand.

The slide-out floor mounted trays shall be provided as follows:

Passenger’s Side 4: One (1) slide-out floor mounted tray

Rear compartment: One (1) slide-out floor mounted tray

268. SWING-OUT TOOL MOUNTING BOARD

A hinged tool board of 0.190” aluminum peg-board style material shall be provided in the compartment over the Driver’s Side rear wheel (Driver's side 2). The board shall be hinged at one side and capable of supporting a minimum of 215 lbs. The tool board shall be kept in the closed position with a “D” style latch. The board shall be mounted in a manner that allows hand tools to be mounted to both the outside and inside surface, as well as the rear wall of the compartment.

269. DROP-DOWN SLIDING TOOL TRAY

There shall be a floor mounted, drop-down slide-out tray with 2.00" sides provided as described below. The tray shall be rated for up to 500lb in the extended position. The tray shall be constructed of .19" aluminum with non-welded corners. The finish shall be painted to match compartment interior.

There shall be two under mount-roller bearing type slides rated at 250lb each provided. The pair of slides shall have a safety factor rating of 2. The slides shall allow the tray to drop approximately 45 degrees downward to allow firefighter to access equipment stored on the shelf.

To ensure years of dependable service, the slides shall be coated with a finish that is tested to withstand a minimum of 1,000 hours of salt spray per ASTM B117.

To ensure years of easy operation, the slides shall require no more than a 50lb force for push-in or pull-out movement when fully loaded after having been subjected to a 40 hour vibration (shaker) test under full load. The vibration drive file shall have been generated from accelerometer data collected from a

heavy truck chassis driven over rough gravel roads in an unloaded condition. Proof of compliance shall be provided upon request.

Automatic locks shall be provided for both the "in" and "out" positions. The trip mechanism for the locks shall be located at the front of the tray for ease of use with a gloved hand.

The drop-down slide-out shelf shall be installed in the Passenger's Side compartment over the rear wheel (Passenger side 2).

270. SLIDE-OUT TOOL BOARD

A slide-out, removable peg board shall be installed in Driver's Side compartment 3. The peg board shall be constructed of 0.190" aluminum with a tubular aluminum frame. The holes in the peg board shall allow for the mounting of equipment brackets.

The peg board shall slide entirely out of the compartment on top and bottom roller tracks, which shall have a 250 lb minimum capacity. The bottom roller track shall have a safety lock that prevents the door from unintentionally coming out of the compartment. The safety lock shall be operable with one hand.

The peg board shall be able to be removed from the track by removing pins on the bottom roller track.

The peg board may be notched to allow for the ladder storage tunnel in the rear of the compartment.

271. AIR BAG AND RESCUE STRUT STORAGE SYSTEM

A system to store the below listed air bags and rescue tools shall be provided in compartment Passenger's Side 1. The system shall be construed with materials that can support the loads imposed by the listed equipment. Any mounting hardware utilized shall not protrude into the air bags storage, or will terminate in an acorn-style nut to prevent damage to the air bags. Four (4) removable poly drawers, approximately 10.00" wide x 8.00" tall x 24.00" long with 0.50" thickness and carrying hand-holes at both ends shall also be provided, and shall be stored within the air bag and rescue tool compartment.

Equipment to be stored in this system shall be:

- Paratech Interstate/Motorway Vehicle Stability Kit strut set
    - 2 x LongShore Strut 304 36-50 in
    - 2 x LongShore Strut 406 48-73 in
    - 2 x LongShore Strut 610 72-116 in (notching of the top of the compartment into the hatch compartment floor is acceptable if necessary to mount these struts)
    - 3 x LongShore 235 Extension 24 in
    - 3 x LongShore 435 Extension 48 in
    - 4 x V Base
    - 4 x Contour Base
    - 4 x Multi-Base
    - 6 x Hinged Base Plate w/ Anchor Ring 12 in
    - 2 x Chain 20 ft x 3/8 in, grade 80

    - 6 x Ratchet Belt w/Finger Hook 27 ft
    - 4 x Tie Down Keys w/J Hook
    - Non Slip Neoprene Pad
- Vetter/Paratech Model 117 lifting air bag set with basic control kit
    - 1 x KPI-12, 15” X 15”
    - 2 x KPI-17, 15” X 21”
    - 2 x KPI-22, 20” X 20”
    - 2 x KPI-32, 24” X 24”
    - 1 x KPI-35L, 15” X 42”
    - Master Control Kit inside a Pelican 1600 case, 19.3" H x 24.6" W x 12" D
- Vetter/Paratech 26 Ton Lifting Bag Set control kit
- Hurst Support System Sets (4 each 1”, 2”, 3” pads; 3” and 6” wedges)
- DeWalt 20 volt Lithium Ion cordless combo kit, with hammer drill and reciprocating saw

272. OIL DRY HOPPER

There shall be an oil dry hopper installed in the right side hatch compartment, above Passenger’s Side compartment 3. A door shall be provided on the top of the oil dry bin to allow refilling of the bin. The bin shall be sized for storage of 200 lbs. of oil dry absorbent material. The hopper shall discharge through a PVC tube through the compartment, routed through the partition between compartments Passenger 3 and Passenger 4, discharging below the body of the truck through a hand-operated valve or gate.

273. AIR HOSE AND REEL

There shall be an air hose reel, Hannay Model ELF1500-14-16 or equal, located in the hatch compartment above Passenger 4. The reel shall have stainless steel internal components, with 12 volt DC power rewind. The rewind button shall be fuse protected and located between 60.00” and 72.00” above the operator’s standing position. Specific location shall be established at the Preconstruction Conference. The air hose reel shall be fed with compressed air from the vehicle’s air tank system. A quarter-turn ball valve shall be provided at the hose reel inlet, accessible from the hatch compartment, to turn the reel off as needed.

The reel shall be supplied with 150 feet of 3/8” utility air hose. The air hose shall be of Buna-N rubber construction with an aramid fiber yarn reinforcement for strength and durability. The air hose shall also have a Rubber Manufacturers Association (RMA) Class A rating for oil resistance and meet Mine Safety and Health Administration standards for fire resistance. The ends of the hose shall have 3/8” NPT male threads. Quick disconnect fittings for the hose will be provided by the customer.

A captive roller assembly shall be provided to aid in the payout and loading of the air hose into the compartments below the mounted locations of the reel. A ball stop shall be provided on the air hose to prevent the hose end from being wound on the reel.

274. MATTING, COMPARTMENT SHELVING

Turtle Tile or similar PVC, slatted/grate style compartment matting, 0.75” thick, shall be provided in all shelves and slide-outs.

The color of Turtle Tile shall be gray.

275. MATTING, COMPARTMENT FLOOR

Turtle Tile or similar PVC, slatted/grate style compartment matting, 0.75” thick, shall be provided in all compartments on the compartment floor. The Turtle Tile shall be gray and the leading edge of the matting shall include a beveled edge. The beveled edge shall be gray.

276. COMPARMTENT INTERIOR MOUNTING SURFACES

The rear wall of the following compartments shall have a Pac Dual Trac style surface in the areas listed. The Pac Dual Trac shall continue as high as practicable in each compartment, and shall be securely mounted as per the manufacturer’s recommendations.

The Pac Dual Trac shall be mounted in the following locations:

Compartment D1: full width, from the bottom of the ladder storage tunnel to as high as practicable

Compartment D2: The entire rear wall of the compartment.

277. RUB RAIL

The bottom edge of the side compartments shall be trimmed with a bright aluminum extruded rub rail.

Trim shall be 3.12" high with 1.50" flanges turned outward for rigidity.

The rub rails shall not be an integral part of the body construction to allow replacement in the event of damage.

Rub rails shall be attached with bolts and spaced from the body with isolators that shall help to absorb any moderate impact without damaging the body.

278. BODY FENDER CROWNS AND LINERS

Black rubber fender crowns shall be provided around the rear wheel openings.

A brushed stainless steel unpainted fender liner shall be provided to avoid paint chipping. The liners shall be removable to aid in the maintenance of rear suspension components.

A dielectric barrier shall be provided between the fender crown fasteners (screws) and the fender sheet metal to prevent corrosion.

The fender crowns shall be held in place with stainless steel screws that thread directly into a composite nut and not directly into the parent body sheet metal to eliminate dissimilar metals contact and greatly reduce the chance for corrosion.

The portion of the rubber fender crown inside the wheel well area shall be supported by a curved stainless steel strip, with a radius the same as the fender opening. This stainless steel strip shall be fastened at least every 6.00” to the inside of the fender using a dielectric barrier between the fasteners and the fender, to prevent the rubber fender crowns from sagging over time.

279. HARD SUCTION HOSE

Two (2) lengths of 6.00" Kochek clear corrugated PVC hard suction hose, 10' in length, shall be provided. The hose shall be equipped with a long handle female coupling on one (1) end and a rocker lug male coupling on the other end. Couplings shall be hard coated aluminum, and shall thread properly onto the pump intake connections.

It is understood that the Kochek hard suction hose may not be fully compliant with the requirements of NFPA 1901 and NFPA 1964.

280. HOSE TROUGHS

Two (2) enclosed troughs for a hard suction hose shall be stacked vertically and installed on to the driver's side of the hose bed.

Both troughs shall be constructed of stainless steel.

Troughs shall be unpainted.

A Velcro-style strap shall be provided at the rear of each trough to retain the hose.

Two (2) vertical handrails shall be located at the rear, one on each side of the rear compartment.

281. AIR CYLINDER STORAGE

Three (3) air cylinder storage compartments shall be provided: one on the driver side forward of the rear wheels and on two on the passenger side, one forward and one aft of the rear wheels. A brightly polished stainless steel door, with a chrome plated flush lift & turn latch shall be provided to contain the air cylinders. Each tube shall be capable of holding three (3) Scott 4500psi, 45 minute carbon fiber wrap air cylinders (Scott model 804722-01). A dielectric barrier shall be provided between the door hinge, hinge fasteners and the body sheet metal.

Inside the compartment, black rubber matting shall be provided. The compartments shall be adequately drained to allow accumulated water to drain from the compartments. The interior finish of the compartment shall not mar, scratch, or otherwise damage the carbon fiber/fiberglass/epoxy wrap or valve of the cylinders.

282. EXTENSION LADDER

There shall be a 24', two-section, aluminum, Duo-Safety, Series 900-A, or equal, extension ladder provided.

283. COMBINATION STEP AND EXTENSION LADDER

There shall be one (1) 10’- 15’ aluminum, Duo-Safety, Series 300-A, or equal, combination step and extension ladder provided.

284. LADDER STORAGE

The ladders shall be stored inside the upper section of the driver's side compartments. This ladder tunnel shall reduce the depth of the upper section in the driver’s side compartments.

A partition shall be installed inside the compartment on the side of the rack to allow for equipment storage and to conceal the ladders. This partition shall have a Pac Dual Trac mounting system mounted on the compartment side, as per Section 276, “Compartment Interior Mounting Surfaces” above.

The ladders shall be banked in separate storage track channels..

The ladder storage assembly shall be fabricated of stainless steel track channels to aid in loading and removal of ladders. Nylatron blocks or equal shall be provided to reduce friction and marring of the ladders as they are slid into and out of the compartments.

Both storage tracks shall be tilted downwards towards the rear of the truck to utilize a “gravity assist” to allow the ladders to easily slide to the rear of the truck, allowing easier removal from ground level.

Rear of the ladder storage area shall have a vertically hinged smooth aluminum door with a D-handle latch to contain the ladders. The rear chevrons shall cover this door, but not the D-handle latch.

285. FOLDING LADDER

One (1) 10.00' aluminum, Series 585-A, Duo-Safety folding ladder shall be installed in a U-shaped trough at the top of the ladder storage compartment.

286. PIKE POLES

Pike poles shall be provided by RIAC, and shall not be considered part of this specification.

287. PIKE POLE STORAGE

Poly tubing shall be used for the storage of three (3) pike poles and shall be located in the ladder storage compartment. If the head of a pike pole can come in contact with a painted surface, a stainless steel scuff plate shall be provided. The tubing shall allow pike poles of up to 12 feet in length to be stored.

288. TOP ACCESS LADDER

A wide, easy climbing access ladder, constructed of aluminum rungs and extruded aluminum rails, shall be provided at the rear of the apparatus on the right side. The inside climbing area of the ladder shall be 13.75" wide.

The lower section of the ladder shall be retractable into the upper section to eliminate interference with the rear FMVSS lights. When lowered the bottom rung shall be lower than the body, approximately 16.00" to 20.00" from the ground to allow a lower first step height.

The ladder shall be slanted when in use for easy access, and fold against the body for storage to reduce the overall vehicle length. Corrosion resistant, stainless steel spring-loaded locks shall hold the ladder in place.

A warning in the cab and/or on the vehicle electronic information system shall indicate if the top access ladder is not properly stowed when the vehicle’s air parking brake is released.

WATER SYSTEM

289. PUMP, GENERAL

Pump shall be a low profile, 1500 gpm single stage midship mounted centrifugal type, mounted below the cab. The pump shall have a 15 percent reserve capacity to allow for extended time between pump rebuild. To ensure efficient pump/vehicle design the capacity to weight ratio shall not be less than 1.5:1.

The pump casing shall consist of three (3) discharge outlets, one (1) to each side in line with the impeller and one (1) to the rear. The pump casing shall incorporate two (2) water strippers to maintain radial balance.

Pump shall be the Class A type.

Pump shall be certified to deliver the percentage of rated discharge from draft at pressure indicated below:

- 100 percent of rated capacity at 150 psi net pump pressure
- 70 percent of rated capacity at 200 psi net pump pressure
- 50 percent of rated capacity at 250 psi net pump pressure

The pump shall have the capacity to deliver the percentage of rated discharge from a pressurized source as indicated below:

- 135 percent of rated capacity at 100 psi net pump pressure from a 5 psi source

Pump body shall be fine-grained gray iron. Pump shall incorporate a heater/cooling jacket integral to the pump housing.

The impeller shall be high strength vacuum cast bronze alloy accurately machine balanced and splined to a ten 10) spline stainless steel pump shaft for precision fit, exceptional durability, and efficiency. Double replaceable, reverse flow, labyrinth type bronze wear rings shall be installed to minimize end thrust. The impeller shall be a twisted vane design to create higher lift. No keyed shafts shall be acceptable.

The pump shall include o-ring gaskets throughout the pump.

Deep groove radial type oversize ball bearings shall be provided. The bearings shall be protected at the openings from road dirt and water with an oil seal and water slinger.

The main inlet manifold shall be 6.00" in diameter and shall have a low profile design to facilitate low crosslays and high flows.

For ease of service, the pump housing, intake wye, impeller, mechanical seal, and gear case shall be accessible from above the chassis frame by tilting the cab. The intake wyes shall be removable without having to remove the main intake casting. Removal of the main inlet wyes shall provide access to the impeller, mechanical seal, and wear ring.

For ease of service and overhaul there shall be no piping or manifolding located directly over the pump.

290. PUMP MOUNTING

Pump shall be mounted to the chassis frame rails directly below the crew cab, to minimize wheelbase and facilitate service, using rubber isolators in a modified V pattern that include two (2) central mounted isolators located between the frame rails and one (1) on each side outside the frame rails. The mounting shall allow chassis frame rails to flex independently without damage to the fire pump. Each isolator shall be 2.55" in total outside diameter and shall be rated at 490 lb. The pump shall be completely accessible by tilting the cab with no piping located directly above the pump.

291. MECHANICAL SEALS

Silicon carbide mechanical seals shall be provided. The seals shall be spring loaded and self-adjusting. The seals shall have a minimum thermal conductivity of 126 W/m*K to run cooler. Seals shall have a minimum hardness of 2800 kg/mm2 to be more resistant to wear, and have thermal expansion characteristics of no more than 4.0 X106mm/mm*K to be more resistant to thermal shock.

292. PUMP GEAR CASE

Pump gear case shall be a pressure-lubricated gear case to cool, lubricate, and filter the oil. The gear case shall include an auxiliary PTO opening. The gear case shall be constructed of lightweight aluminum, and impregnated with resin in accordance with Mil Spec I-17563. A dipstick, accessible by tilting the cab, shall be provided for fluid level checks. A filter screen shall be provided for long life.

The gear case shall consist of two (2) gears to drive the pump impeller and one (1) for the auxiliary PTO.

The auxiliary PTO opening shall provide for the addition of PTO driven accessories.

The pump shall be driven through the rear engine power take-off and clutch. The rear engine power take-off drive shall be live at all times to allow for pump and roll applications.

293. CLUTCH

There shall be a heavy-duty electric clutch mounted directly to the front of the pump to engage and disengage the pump without gear clash. The clutch shall be a multiple disc design for maximum torque. The clutch shall be fully self-adjusting to provide automatic wear compensation, and consistent torque throughout the life of the clutch. Positive engagement and disengagement shall be provided through a high efficient and dependable magnetic system to assure superior performance. The clutch shall have a 500 lb-ft rating.

294. PUMPING MODES

The pump shall provide for both pump and roll mode and stationary pumping mode. A split-shaft type pump that does not provide for a pump and roll mode shall not be acceptable.

Stationary pumping mode shall be accomplished by stopping the vehicle, setting the parking brake and engaging the water pump switch on the cab switch panel. The transmission shall shift to "Neutral" range automatically when the parking brake is set. The "OK to Stationary Pump" indicator shall also illuminate when the parking brake is set. The foam system shall also be able to be engaged from the cab switch panel as well.

Pump and roll mode shall be accomplished by the use of the main pump and shall not require the use of a secondary pump. The "OK to Pump & Roll" indicator shall be illuminated when the vehicle is in first gear. If pump and roll is desired by the operator, the operator shall engage the "Pump & Roll" and "Water Pump" switches on the cab switch panel. There shall be an automatic opening tank to pump valve and an automatic opening recirculation valve with the pump and roll mode so the operator does not have to leave the cab. The “Pump & Roll” and “Water Pump” switches shall be adjacent to each other on the cab switch panel.

A “Crash Mode” switch shall be provided at the driver’s control panel, adjacent to the “Pump & Roll” switch. This switch shall bring the engine and pump RPMs to a sufficient level to provide 500 gallons per minute flow to the bumper turret. The control may use either engine RPM or sense actual pump pressure to provide this control. The switch shall control the engine RPM regardless of selected transmission gear, or application of the parking brake, service brake, or accelerator pedal. If engine RPM is utilized, a means to adjust the pumping RPM when in this mode shall be provided.

The truck shall be capable of maintaining a 500 gallon per minute flow to the bumper turret, supplying the bumper turret nozzle at its manufacturer-required pressure, while in pump and roll mode at 10 miles per hour speed, using only tank water (no pressurized water sources are permitted), and discharging foam at a 3% ratio. **There shall be no exceptions to this requirement.**

Stopping pump and roll mode shall be accomplished by stopping the vehicle and setting the parking brake. The "OK to Pump & Roll" indicator shall turn off, the "OK to Stationary Pump" indicator shall illuminate and the transmission shall automatically shift to neutral. Pressing the “Water Pump” switch down shall also terminate pump and roll.

Stopping the stationary pump mode shall be accomplished by pressing the "Water Pump" switch down to disengage the pump.

295. PUMP SHIFT

Pump shall be engaged in not more than two steps, by setting the parking brake, which shall automatically put the transmission into neutral, and activating a rocker switch in the cab. Switches in the cab shall also allow for water or foam, and activate the appropriate system to preset parameters. The engagement shall provide simple two-step operation, enhance reliability, and completely eliminate gear clash. The shift shall include the indicator lights as required by NFPA 1901. A direct override switch shall be located behind a door in the lower pump operator's panel. The switch shall automatically disengage when the door is closed.

As the parking brake is applied, the pump panel throttle shall be activated and deactivate the chassis foot throttle for stationary operation.

Pump and roll operation shall be restored by releasing the parking brake with the pump in the pumping mode. Releasing the parking brake shall activate the chassis foot throttle, and deactivate the pump panel throttle. Crash mode shall override the chassis foot throttle to provide adequate pressures and flow rates to the bumper turret. To protect from accidental pump overheating, the transmission shall not shift into a gear higher than first gear when in pump and roll mode. **Under no circumstances shall the truck disengage the pump automatically without operator confirmation/control**.

296. TRANSMISSION LOCK UP

Transmission lock up is not required as transmission shall automatically shift to neutral as soon as the parking brake is set.

While in pump and roll operation, the transmission shall allow reverse, neutral or first forward gear. The transmission shall not allow shifting into any gear higher than first when pump and roll is engaged. Shifting of the transmission shall be possible through forward (1^{st} only), neutral, and reverse with pump and roll engaged, without discontinuing the flow of water.

297. AUXILIARY COOLING SYSTEM

A supplementary heat exchange cooling system shall be provided to allow the use of water from the discharge side of the pump for cooling the engine water. A water-to-coolant heat exchanger shall be used.

298. INTAKE RELIEF VALVE

An Akron relief valve shall be installed on the suction side of the pump, preset at 125 psig.

Relief valve shall have a working range of 75 psig to 200 psig.

Outlet shall terminate below the frame rails with a 2.50" National Standard hose thread adapter and shall have a "do not cap" warning tag.

Control shall be located behind an access door at the right (passenger's) side pump panel.

299. PRESSURE CONTROLLER

An electric pressure governor shall be provided which is capable of automatically maintaining a desired preset discharge pressure in the water pump. When operating in the pressure control mode, the system shall automatically maintain the discharge pressure set by the operator regardless of flow, within the discharge capacities of the water pump and water supply.

A pressure transducer shall be installed in the water discharge of the pump. The transducer shall continuously monitor pump pressure, sending a signal to the Electronic Control Module (ECM).

The governor shall be capable of being used in two (2) modes of operation, RPM mode and pressure modes.

In the RPM mode, the governor can be activated after vehicle parking brake has been set. When in this mode, the governor shall maintain the set engine speed, regardless of engine load (within engine operation capabilities).

In the pressure mode, the governor system shall only operate after the fire pump has been engaged and the vehicle parking brake has been set. When in the pressure mode, the pressure controller shall monitor the pump pressure and vary engine speed to maintain a precise pump pressure. The pressure controller shall use a quick reacting J1939 database for engine control.

A preset feature shall allow a predetermined pressure or rpm to be set. The preset pressure or rpm shall be programmable by the department without the need for special tools or software.

A pump cavitation protection feature is also provided which shall return the engine to idle should the pump cavitate. Cavitation is sensed by the combination of pump pressure below 30 psi and engine speed above 2000 rpm for more than five (5) seconds.

The throttle shall be a Vernier-style control, with a large control knob for use with a gloved hand. A throttle ready light shall be provided adjacent to the throttle control. A large .75" RPM display shall be provided to be visible at a glance.

An “Idle” button shall be located in the center of the throttle, which shall shut down the pump controller and bring the engine to low idle.

Check engine, and stop engine indicator lights shall be provided for easy viewing.

Large 0.75" push buttons shall be provided for menu, mode, preset, and silence selections.

The water tank level indicator shall be incorporated in the pressure governor.

A fuel level indicator shall be incorporated in the pressure controller.

A pump hour meter shall be incorporated in the pressure controller.

Engine monitoring graduated LED indicators shall be incorporated with the pressure controller.

The pressure controller shall incorporate monitoring for engine temperature, oil pressure, fuel level alarm, and voltage. Pump monitoring shall include, pump gear case temperature, error codes, diagnostic data, pump service reminders, and time stamped data logging, to allow for fast accurate trouble shooting. It shall also notify the driver/engineer of any problems with the engine and the apparatus. Complete understandable messages shall be provided in a 20-character display, providing for fewer abbreviations in the messages. An automatic dim feature shall be included for night operations.

The pressure controller shall include a USB port for easy software upgrades, which can be downloaded through a USB memory stick, eliminating the need for a laptop for software installations. The USB port shall be protected from water infiltration.

A complete interactive manual shall be provided with the pressure controller.

300. PRIMING PUMP

The priming pump shall be a Trident Emergency Products compressed air powered, high efficiency, multistage venturi-based, three barrel AirPrime system, conforming to the requirements of NFPA 1901.

All wetted metallic parts of the priming system are to be of brass and stainless steel construction.

One (1) priming control shall open the priming valve and start the pump primer.

Two (2) additional priming valves shall be plumbed to the driver and passenger side main inlets. The additional controls shall be located at the pump operator's panel. The passenger side primer shall be plumbed to the outside portion of the master intake valve. The driver's side primer shall routed to the driver's side pump panel and be capped for later use.

Under no circumstances shall the primer discharge any oil when utilized.

301. PLUMBING

All inlet and outlet plumbing smaller than 3.00" in diameter shall be plumbed with either stainless steel pipe or synthetic rubber hose reinforced with high-tensile polyester braid. Plumbing 3.00" in diameter or greater shall be stainless steel pipe. Small diameter secondary plumbing such as drain lines shall be stainless steel, brass or hose.

Where vibration or chassis flexing may damage or loosen piping or where a coupling is required for servicing, the piping shall be equipped with Victaulic or rubber couplings.

Plumbing manifold bodies shall be ductile iron or stainless steel. Cast iron or aluminum shall not be used.

All lines shall drain through a master drain valve or shall be equipped with individual drain valves. All individual drain lines for discharges shall be extended with a hose to drain below the chassis frame.

All water carrying gauge lines shall be of flexible polypropylene tubing.

302. MAIN PUMP INLETS

A 6.00" pump manifold inlet shall be provided on each side of the vehicle. The suction inlets shall include removable die cast zinc screens that are designed to provide cathodic protection for the pump, thus reducing corrosion in the pump.

Main pump inlets shall not be located on the main operator's panel and shall maintain a low connection height by terminating below the top of the chassis frame rail.

303. MAIN PUMP INLET CAPS

The two main pump inlets shall have male 6.00" National Standard threads (6-4 thread). The left side inlet shall have a long handle chrome cap.

The cap shall incorporate a thread design to automatically relieve stored pressure in the line when disconnected.

The right side main pump inlet shall have a 6.00” threaded to 5.00” Storz 30 degree elbow, hard coated aluminum reducer with a blind 5.00” Storz cap, with chain, attached.

304. VALVES

All ball valves shall be Akron Brass 8900 series in-line valves. The valves shall be of a heavy-duty style with a stainless steel ball and a simple two-seat design. No lubrication or regular maintenance shall be required on the valve.

Valves shall have a ten (10) year warranty.

305. LEFT SIDE AUXILIARY INLET

On the left side pump panel shall be one (1) 2.50" auxiliary suction, terminating in 2.50" National Standard Hose Thread. The auxiliary suction shall be provided with a strainer, chrome swivel and plug.

The inlet valve shall be recessed behind the pump panel.

306. AUXILIARY INLET CONTROL

The auxiliary inlet shall incorporate a quarter-turn ball valve with the control located at the inlet. The handles shall be an Akron TS style handle. The valve operating handle shall indicate the position of the valve.

307. PUMP INLET ANODE

Two (2) sacrificial zinc anodes shall be provided in the water pump inlets to protect the pump from corrosion.

308. RIGHT-SIDE MAIN INLET CONTROL

The right side main inlet shall be controlled by an Akron 9323 Navigator Pro electric valve controller provided at the main pump control panel. The valve controller shall operate the 6.00” passenger's side inlet. The controller unit shall be of true position feedback design, requiring no clutches in the motor or current limiting. The controller shall be completely sealed with two (2) button open and close valve position capability and a full color LCD display with backlight.

309. INLET BLEEDER VALVE

A 0.75" bleeder valve shall be provided for each side gated inlet. The valves shall be located behind the panel with a swing style handle control extended to the outside of the panel. The handles shall be chrome plated and provide a visual indication of valve position. The swing handle shall provide an ergonomic position for operating the valve without twisting the wrist and providing high leverage. The water discharged by the bleeders shall be routed below the chassis frame rails.

310. TANK TO PUMP

The tank to pump line shall have a minimum 3.00" Akron 8900 series full flow ball valve with an R1 style handle. This valve shall be controlled by an air actuated cylinder. The cylinder shall be large enough to assure positive opening and closing of the valve. The controls shall be located on the left pump operator's panel, be properly labeled as its function and feature "green" valve open and "red" valve closed indicator lights.

A minimum 3.00" one-way full flow check valve shall be provided in the tank suction line to prevent back flow to the tank.

The tank to pump valve shall open automatically to the full open position when the “Pump and Roll” switch in the cab is engaged.

The tank to pump line, valve, or check valve may be increased in size if needed to meet the bumper turret flow requirements.

311. TANK REFILL

A 2.00" combination tank refill and pump re-circulation line shall be provided, using a quarter-turn full flow ball valve controlled from the pump operator's panel.

The re-circulation line shall automatically open during pump-and-roll operation, as needed, to prevent pump overheat. The opening of this line should, however, be restricted when the bumper turret is in operation as to allow the maximum amount of water to be utilized by the turret, not recirculated back to the water tank.

312. LEFT SIDE DISCHARGE OUTLETS

There shall be two (2) discharges with 2.50" valves on the left side of the apparatus, terminating with a 2.50" male National Standard hose thread adapter. Discharges shall be located below the cab, and shall be no higher than the top of the chassis frame rail. Discharges shall not be located on the pump operator's panel. Lever controls shall be provided at the valve with Akron TS style handles.. The valve itself shall be behind the pump panel, with only the operating lever protruding through the panel.

313. RIGHT SIDE DISCHARGE OUTLET

There shall be one (1) discharge outlet with an Akron electrical actuator 2.50" valve on the right side of the apparatus, terminating with a male 2.50" National Standard hose thread adapter. The discharge shall be located below the crew cab, and shall be no higher than the top of the chassis frame rail. The valve for this outlet shall be behind the pump panel.

There shall be an Akron 9325 Navigator Pro electric valve controller provided at the pump panel to operate this valve. The controller unit shall be of true position feedback design, requiring no clutches in the motor or current limiting. The controller shall be completely sealed with two (2) button open and

close valve position capability and a full color LCD display with backlight. In addition to valve position, the controller shall include a display showing pressure and water flow rate with totalizer.

314. LARGE DIAMETER DISCHARGE OUTLET

There shall be a 4.00" discharge outlet with a 4.00" Akron electrically actuated 8900 series valve body installed on the right side of the apparatus, terminating with a male 4.00" National Standard hose thread. The discharge shall be located below the crew cab, and shall be no higher than the top of the chassis frame rail. The valve for this outlet shall be behind the pump panel.

There shall be an Akron 9325 Navigator Pro electric valve controller provided at the pump panel to operate this valve. The controller unit shall be of true position feedback design, requiring no clutches in the motor or current limiting. The controller shall be completely sealed with two (2) button open and close valve position capability and a full color LCD display with backlight. In addition to valve position, the controller shall include a display showing pressure and water flow rate with totalizer.

315. FRONT BUMPER TURRET PLUMBING

Plumbing consisting of 2.50" or larger piping and flexible hose from the electrically operated bumper turret valve in the pump house to the driver's side front bumper shall be provided. A fabricated weldment made of stainless steel pipe shall be used in the plumbing where appropriate.

There shall be automatic drains provided at all low points of the piping that open when pressure in the plumbing drops to non-flow levels.

The plumbing to the bumper turret shall support 500 gpm flows to the turret nozzle, at the turret and nozzle manufacturer’s recommended pressures. **There shall be no exceptions to this requirement.**

316. BUMPER TURRET

One (1) Task Force Tips Tornado RC, model Y2-E11A remote controlled monitor shall be provided on the front bumper extension on the left side. The monitor shall be provided with a Task Force Tips Max-Force 100-500 gpm Dual Pressure Automatic 100 psi / 55 psi nozzle, model MD-ERP-12A. The monitor shall have a quick disconnect feature at its base to allow rapid removal of the monitor to allow tilting of the cab without damaging the monitor, bumper extension, or cab.

The monitor shall have a horizontal rotation of 180 degrees, and vertical travel from 45 degrees below horizontal to 90 degrees above horizontal.

A Task Force Tips model Y4E-JS-52-GT joystick monitor operator station with gateable valve control shall be provided in the cab between the driver and the officer to control discharge, nozzle pattern control, and elevation/rotation of the monitor.

The monitor base with 2.50" plumbing shall be provided.

An electric 2.50" full flow ball valve, Task Force Tips model YE-VK-PJ, shall be provided at the pump discharge manifold to supply the bumper turret. The valve size may be increased if necessary to achieve the 500 gallon per minute flow rate to the turret. The valve shall be activated by the turret controls in the cab, and shall be capable of being throttled by the gateable valve control on the cab joystick.

317. BUMPER HANDLINE AIR BLOWDOWN VALVE

A means shall be provided at the pump operator's panel to use compressed air from the vehicle's air system to remove water from the bumper preconnected handline plumbing to prevent water trapped in the plumbing from freezing.

318. REAR DISCHARGE OUTLETS

There shall be two (2) discharge outlets piped to the rear of the hose bed, on the driver's side and passenger's side, installed so proper clearance is provided for spanner wrenches or adapters. Plumbing shall consist of 3.00" piping along with a 3.00" full flow ball valve with manual control from the pump operator's panel. Discharge shall terminate with 2.50" NST thread. Discharge piping shall be schedule 10 304L welded or formed stainless steel and routed through the water tank.

The discharges shall be located below the hose bed, providing adequate clearance for 1000 feet of 5.00" hose to be deployed from the center of the hose bed. The discharges shall be no more than 70.00" from ground level, nor less than 48.00" from ground level.

319. DISCHARGE CAPS

Chrome plated, 1.50" rocker lug caps with chains shall be furnished for all side and rear discharge outlets, with the exception of the LDH discharge. Cap chains shall be fastened to the pump panel, or rear of the truck in the case of the rear discharges, to prevent loss of the caps.

The caps shall incorporate a thread design to automatically relieve stored pressure in the line when disconnected.

Each discharge outlet shall also have a 2.50" female NH x 1.50" male NH chrome plated rocker lug reducer.

320. REAR OUTLET ELBOWS

The 2.50" discharge outlets located at the rear of the apparatus shall be furnished with a 2.50" female NH thread x 2.50" male NH thread, chrome plated, 45 degree elbow.

The elbows shall incorporate a thread design to automatically relieve stored pressure in the line when disconnected.

321. OUTLET BLEEDER VALVES

A 0.75" bleeder valve shall be provided for each outlet 1.50" or larger. Automatic drain valves are acceptable with some outlets, specifically the bumper turret, if deemed appropriate with the application.

The valves shall be located behind the panel with a swing style handle control extended to the outside of the side pump panel. The handles shall be chrome plated and provide a visual indication of valve position. The swing handle shall provide an ergonomic position for operating the valve without twisting the wrist and provides excellent leverage. Bleeders shall be located at the bottom of the pump panel. They shall be properly labeled identifying the discharge they are plumbed in to. The water discharged by the bleeders shall be routed below the chassis frame rails.

322. LARGE DIAMETER DISCHARGE ADAPTER

The large diameter outlet shall terminate in a 4.00” National Standard male thread. A 30 degree hard coat aluminum elbow shall be provided for the outlet, terminating in a 5.00” Storz coupling. A 5.00” to 4.00 inch Storz adapter with a 4.00 inch blind cap and chain shall be provided. The blind cap shall not have a locking lever.

323. DISCHARGE OUTLET CONTROLS

The manually operated discharge outlets at the pump operator's panel (preconnected handlines [crosslay and bumper] and rear discharges) shall incorporate a quarter-turn ball valve with the control located at the pump operator's panel. The valve operating mechanism shall indicate the position of the valve or an indicator shall be provided to show when the valve is closed. These valve handles shall lock to prevent valve movement when flowing.

The passenger side discharges shall be controlled by an Akron 9325 Navigator Pro electric valve controllers with the manual override located on the passenger side pump panel. The controller units shall be of true position feedback design, requiring no clutches in the motor or current limiting. The controller shall be completely sealed with two (2) button open and close valve position capability and a full color LCD display with backlight. In addition to valve position, each controller shall include a pressure and discharge rate display with totalizer.

The driver's side discharges shall have manual swing handles at the driver's side pump panel panel that operate in a vertical up and down motion. These handles shall be able to lock in place to prevent valve creep under pressure.

324. DELUGE RISER

A 3.00" deluge riser shall be installed above the pump in such a manner that a monitor can be mounted and used effectively. The 3.00" piping shall be installed securely so no movement develops when the line is charged. A 3.00" valve shall be installed and controlled at the pump operator's panel. The deluge outlet shall flow a minimum 1250 GPM.

The deluge riser shall have a 3.00" NPT male fitting for mounting of the extendable portion of the deluge riser assembly.

A Task Force Tips 18.00” x 3.00” diameter Extend-a-Gun, electrically operated extendable riser shall be provided to allow the deluge monitor to extend over the cab and body. The remote control shall be mounted at the pump operator’s position. The Extend-a-Gun shall cause activate the “Do Not Move

Truck" light in the cab to illuminate and a text warning on the vehicle electronic information system to be displayed when it is not stowed.

The deluge riser valve shall be controlled by an Akron 9325 Navigator Pro electric valve controller provided at the pump panel to operate this valve. The controller unit shall be of true position feedback design, requiring no clutches in the motor or current limiting. The controller shall be completely sealed with two (2) button open and close valve position capability and a full color LCD display with backlight. In addition to valve position, the controller shall include a display showing pressure and water flow rate with totalizer.

325. MONITOR

A Task Force Tips "Hurricane" model 0-1250 gpm, electric radio remote control waterway monitor, with a silver powder coat finish, shall be properly installed on the deluge riser extension. The monitor shall have a 2.50" male NH discharge thread. The monitor shall be equipped with an automatic drain valve at the low point. A pressure gauge shall not be installed.

This monitor shall include all electric 12 VDC controls for the monitor.

The monitor shall include the automatic stow feature.

A Task Force Tips wireless radio remote control for the monitor and deluge nozzle shall be supplied. The Aux 1 and Aux 2 buttons on the wireless remote shall control the raising and lowering of the extendable deluge riser. A bracket to hold the wireless remote shall be provided in the pump operator's compartment.

326. MONITOR NOZZLES

Two monitor nozzles shall be supplied, an Akron Brass 4480 "Akrofoam" self educting nozzle and a Task Force Tips Master Stream 1500 Electric Remote.

The self educting "Akrofoam" nozzle shall have a 2.50" female NH inlet thread and shall be provided with an 8 foot long x 1.50" cam-lock foam concentrate pickup tube and orifice plates for 1%, 3%, and 6% foam proportioning. The nozzle shall be field adjustable between 350, 500, 750, or 1000 gpm flow rates without the use of tools.

The Master Stream 1500 Electric Remote shall be Task Force Tips model number M-ERP1500-NJ, with a 2.50 inch female NH inlet thread, and 12 volt DC electrical plug connection to communicate with the monitor controls. The plug shall easily disconnect from the monitor control to allow the nozzle to be removed from the monitor. The pattern control of the nozzle shall be controlled by the wireless remote control.

327. CROSSLAY HOSE BEDS

Two (2) crosslays with 1.50" outlets shall be provided. Each bed shall be capable of carrying 300' of 1.75" hose double jacketed hose and shall be plumbed with 2.00" i.d. schedule 10, 304L welded or formed stainless steel pipe and gated with a 2.00" quarter turn ball valve located at the pump operator's

panel. Threaded pipe shall not be acceptable. The two (2) crosslays shall be located just above the frame rails.

The 1.50” outlets shall be equipped with a male 1.50" National Standard hose thread 90-degree swivel with spanner lugs located in the hose bed so that hose may be removed from either side of apparatus. The swivel connections shall be located no more than 12.00” from the edge of the hose bed to allow access from a standing position adjacent to the truck. Connections at the center of the hose bed shall not be permitted.

One (1) crosslay with a 2.50" outlet shall be provided. The bed to be capable of carrying 200' of 2.5" double jacketed hose and shall be plumbed with 2.50" i.d. schedule 10 304L welded or formed stainless steel pipe and gated with a 2.50" quarter turn ball valve located at the pump operator’s panel. Threaded pipe shall not be acceptable.

The 2.50” crosslay shall be located immediately above the 1.50” crosslays, to the rear/body side of the crosslay area. The 2.50” crosslay shall have a track or other divider to prevent the crosslay tray from sliding into the backboard storage area adjacent to the tray.

The 2.50” outlet shall be equipped with a male 2.50" National Standard hose thread 90 degree swivel with spanner lugs located above the hose bed so that hose may be removed from either side of apparatus. The swivel connection shall be located no more than 12.00” from the edge of the hose bed to allow access from a standing position adjacent to the truck. Connections at the center of the hose bed shall not be permitted.

The crosslay controls shall be at the pump operator's panel.

The hose beds shall be full width of the body compartments.

Removable trays shall be provided for the three (3) crosslay hose beds. The crosslay trays shall be as wide as the crosslay openings will allow and be constructed of black poly to provide a lightweight sturdy tray. Two (2) hand holes shall be in the floor and additional hand holes shall be provided in the sides for easy removal and installation to and from the compartment. The floor of the trays shall be perforated to allow for drainage and hose drying. Tray shall be held in place by a mechanical spring loaded stainless steel latch that automatically deploys upon loading the tray to hold the trays in place during transit.

328. LONG BACKBOARD STORAGE TROUGH

A trough shall be provided adjacent to the 2.50” crosslay, on the forward/cab side of the crosslay, for the storage of long backboards. The trough shall be the width of the truck, and accessible through the crosslay end roll-up doors from both sides of the truck. The trough interior shall be constructed of 304L stainless steel, with nylon spacers at the bottom to provide a smooth surface for the long backboards to slide on.

329. ROLL-UP DOOR, CROSSLAY ENDS

The compartment doors shall be roll-up style, double faced aluminum construction painted one (1) color to match the lower portion of the body and manufactured by Amdor. The crosslay enclosure shall be full width of the body.

Door(s) shall be constructed using 1.00" extruded double wall aluminum slats which will feature a flat smooth interior surface to provide maximum protection against equipment hang-up. The slats shall be connected with a structural driven ball and socket hinge designed to provide maximum curtain diaphragm strength. Mounting and adjusting the curtain shall be done with a clip system that connects the curtain to the balancer drum allowing for easy tension adjustment without tools. The slats shall be mounted in reusable slat shoes with positive snap-lock securement.

Each slat will incorporate weather tight recessed dual durometer seals. One (1) fin will be designed to locate the seal within the extrusion. The second will serve as a wiping seal which will also allow for compression to prevent water ingress.

The doors shall be mounted in a one (1)-piece aluminum side frame with recessed side seals to minimize seal damage during equipment deployment. All seals including side frames, top gutters and bottom panel are to be manufactured utilizing non-marring materials.

The bottom panel flange of the rollup door shall be equipped with a cut-out to allow for easier access with gloved hands.

A stainless steel lift bar is to be provided for opening the door and located at the bottom of each door with latches on the outer extrusion of the door frame. A ledge shall be provided over the lift bar for additional area to aid in closing the door. The lift bar shall be located at the bottom of door with striker latches installed at the base of the side frames. Side frame mounted door strikers shall include support beneath the stainless steel lift bar to prevent door curtain bounce, improve bottom seal life expectancy and to avoid false door ajar signals.

All injection molded rollup door wear components will be constructed of Type 6 nylon.

Each rollup door shall have a 3.00 inch diameter balancer/tensioner drum to assist in lifting the door. A garage door style shall not acceptable.

The header for the rollup door assembly shall not exceed 4.00".

A heavy-duty magnetic switch shall be used for control of open compartment door warning lights. Contact-type momentary switches shall not be used for the compartment open warning light system, due to frequent faults with this type of switch.

330. PUMP CONTROL PANEL

Pump controls and gauges shall be located midship at the left (driver's) side of the apparatus and properly identified.

The main pump operator's control panel shall be completely enclosed and located in the forward section of the body compartment, to protect against road debris and weather elements. The pump operator's panels shall be no more than 31.00" wide, and made in four (4) sections with the center section easily removable with simple hand tools. For the safety of the pump operator, there shall be no discharge outlets or pump inlets located on the main pump operators panel.

Layout of the pump control panel shall be ergonomically efficient and systematically organized. The upper section shall contain the master gauges. This section shall be angled down for easy visibility. The center section shall contain the pump controls aligned in two horizontal rows. The pressure control device, engine monitoring gauges, electrical switches, and foam controls (if applicable) shall be located on or adjacent to the center panel, on the side walls for easy operation and visibility. The lower section shall contain the outlet drains.

Manual controls shall be easy moving 8" long lever style controls that operate in a vertical, up and down swing motion. These handles shall have a 2.25" diameter knob and be able to lock in place to prevent valve creep under any pressure. Bright finish bezels shall encompass the opening, be securely mounted to the pump operator's panel, and shall incorporate the discharge gauge bezel. Bezels shall be bolted to the panel for easy removal and gauge service. The driver's side discharges shall be controlled directly at the valve. There shall be no push-pull style control handles.

Identification tags for the discharge controls shall be recessed within the same bezel. The discharge identification tags shall be color coded, with each discharge having its own unique color.

Discharges and intakes utilizing the Akron 9325 Navigator Pro valve controllers shall be color coded using the color indicators specifically designed for the Navigator Pro controller. Also, the discharge or intake name and color shall be programmed to display on the controller screen.

All remaining identification tags shall be mounted on the pump panel in chrome-plated bezels.

All discharge outlets shall be color coded and labeled to correspond with the discharge identification tag.

The pump panels for the midship discharge and intake ports shall be located ahead of the body compartments with no side discharge or intake higher than the frame rail. The pump panels shall be easily removable with simple hand tools.

A recessed cargo area shall be provided on top of the truck, at the front of the body, ahead of the water tank above the plumbing.

331. PUMP PANEL CONFIGURATION

The pump panel configuration shall be arranged and installed in an organized manner that shall provide user-friendly operation.

Final configuration of the pump panel shall be approved by RIAC prior to installation.

332. PUMP AND GAUGE PANEL

The pump operator's panel and gauge panels shall be constructed of stainless steel with a brushed finish.

The side control panels shall be constructed of stainless steel with a brushed finish for durability and ease of maintenance.

333. PUMP AND PLUMBING ACCESS

Simple access to the plumbing shall be provided through the front of the body area by raising the cab for complete plumbing service and valve maintenance. Access to valves shall not require removal of operator panels or pump panels. Access for rebuilding of the pump shall not require removal of more than the tank to pump line and a single discharge line. This access shall allow for fast, easy valve or pump rebuilding, making for reduced out of service times. Steps shall be provided for access to the top of the pump.

Access to the pump shall be provided by raising the cab. The pump shall be positioned such that all maintenance and overhaul work can be performed above the frame and under the tilted cab. The service and overhaul work on the pump shall not require the removal of operator panels or pump panels. Complete pump casing and gear case removal shall require no more than removal of the intake and discharge manifolds, driveline, coolers and a single discharge line. The pump case and gear case shall be able to be removed by lifting upward without interference from piping and be removable in less than 3 hours.

334. PUMP FREEZE PROTECTION

A means shall be provided to enclose the pump and plumbing system to allow the truck to operate in temperatures of -30 degrees Fahrenheit without causing the pump or plumbing to freeze. Any enclosure shall be easily removable for maintenance purposes, and shall not substantially interfere with ground clearance underneath the vehicle.

335. PUMP COMPARTMENT LIGHT

A pump compartment light shall be provided inside the plumbing area.

A .125" weep hole shall be provided in each light lens to prevent moisture retention.

336. VACUUM AND PRESSURE GAUGES

The pump vacuum and master pressure gauges shall be liquid filled and manufactured by Class 1, Inc.

The gauges shall be a minimum of 4.00" in diameter and shall have white faces with black lettering, with a pressure range of 30.00" of mercury (vacuum) to 0.00” vacuum as well as 0 to 600 psi.

Gauge construction shall include a Zytel nylon case with adhesive mounting gasket and threaded retaining nut.

The pump pressure and vacuum gauges shall be installed adjacent to each other at the top of the pump operator's control panel.

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

These gauges shall include a 10 year warranty against leakage, pointer defect, and defective bourdon tube.

337. PRESSURE GAUGES

The individual "line" pressure gauges for the discharges shall be liquid filled and manufactured by Class 1.

They shall be a minimum of 2.00" in diameter and the dial shall have white faces with black markings.

Gauge construction shall include a Zytel nylon case with adhesive mounting gasket and threaded retaining nut.

Gauges shall have a pressure rating of 0-400 psi.

The individual pressure gauge shall be installed as close to the outlet control as practical, arranged in a logical and consistent manner, taking into consideration the entire pump panel layout.

These gauges shall include a 10 year warranty against leakage, pointer defect, and defective bourdon tube.

338. PUMP PANEL WATER LEVEL GAUGE

An electric water level gauge shall be provided that registers water level by means of 9 LEDs. They shall be at 1/8 level increments with a tank empty LED. The LEDs shall be a bright type that is readable in sunlight, and have a full 180-degree of clear viewing.

To further alert the pump operator, the gauge shall have a warning flash when the tank volume is less than 25%, and shall have "Down Chasing” LEDs when the tank is almost empty.

The level measurement shall be ascertained by sensing the head pressure of the fluid in the tank or cell. Systems that utilize floats or wetted switches shall not be acceptable.

339. LARGE-FORMAT WATER LEVEL GAUGES

There shall be two (2) additional water level indicators, Whelen, Model PSTANK, LED module installed one (1) each side on the crew cab extension.

This light module shall include four (4) colored levels, and function similar to the water level indicator located at the operators panel:

• First green module indicates a full water level

• Second blue module indicates a water level above 3/4 full

• Third amber module indicates a water level above 1/2 full

• Last red module indicates a water level above 1/4 full and empty. Above 1/4 this light shall be steady burning, and shall flash at empty.

This module shall be activated when the pump is in gear.

The level measurement shall be ascertained by sensing the head pressure of the fluid in the tank or cell. Systems that utilize floats or wetted switches shall not be acceptable.

340. CAB WATER LEVEL GAUGE

An electric water level gauge shall be located in the cab that registers water level by means of 9 LEDs. They shall be at 1/8 level increments with a tank empty LED. The LEDs shall be a bright type that is readable in sunlight, and have a full 180-degree of clear viewing.

To further alert the driver, the gauge shall have a warning flash when the tank volume is less than 25%, and shall have "Down Chasing" LEDs when the tank is almost empty.

The level measurement shall be ascertained by sensing the head pressure of the fluid in the tank or cell. Systems that utilize floats or wetted switches shall not be acceptable.

341. SIDE CONTROL PUMP OPERATOR'S/PUMP PANEL LIGHTING

Illumination shall be provided for controls, switches, essential instructions, gauges, and instruments necessary for the operation of the apparatus and the equipment provided on it. External illumination shall be a minimum of five (5) foot-candles on the face of the device. Internal illumination shall be a minimum of 13.7 nits.

The pump panels shall be illuminated by a light on each side of the back of the cab.

The pump operator's panel shall utilize strip lighting on both sides of the doorframe and an overhead light.

The pump operator's panel lighting shall turn on with the compartment lights when the pump control panel door is opened, or via a switch at the pump operator's panel.

FOAM SYSTEM

342. FOAM SYSTEM, GENERAL

A foam proportioning system shall be provided that is an on demand type, balanced pressure system suitable for all types of foam concentrates. The system shall automatically balance and proportion foam solution at rates from 1 percent to 6 percent regardless of variations in water pressure and flow, up to the maximum rated capacity of the foam concentrate pump. The design of the system shall allow operation from draft, tank, hydrant, or relay operation.

Any materials used in the construction of the foam system, including seals or gaskets of any kind, shall be constructed of materials that are compatible with foam concentrates. Aluminum, mild steel, galvanized pipe, or glued Schedule 40 or thinner poly vinyl chloride pipe shall not be used in any portion of the foam system that is in contact with foam concentrate.

343. SYSTEM CAPACITY

The system shall have the ability to deliver the following minimum foam solution flow rates:

30 gpm foam concentrate = 500 gpm foam solution @ 6 percent

30 gpm foam concentrate = 1000 gpm foam solution @ 3 percent

30 gpm foam concentrate = 3000 gpm foam solution @ 1 percent

Maximum foam solution capacity shall be limited to the water pump/plumbing capacity.

All foam solution discharges shall be independent of the other discharges and be capable of foam or water operation, regardless of the status of other foam outlets. Individual foam concentrate metering valves shall allow operation various outlets at different concentrations simultaneously, as conditions dictate.

Due to the operational requirements of this vehicle, all discharges on the vehicle, excluding the deluge monitor, shall have the ability to flow foam. It is understood by RIAC that the foam system will not necessarily be able to flow foam solution from all discharges simultaneously, however the ability to flow foam from each discharge is still required. **No exceptions to this requirement shall be permitted**.

344. BALANCED PRESSURE CONTROL SYSTEM

A digital foam pressure manager shall be provided for the management of a hydraulic foam pump drive system. The foam pressure manager shall monitor the water and foam pressures by way of precision electric pressure transducers. The foam pressure manager shall then control the displacement of a piston type hydraulic pump. The varying displacement of the pump shall result in the varying of the rotational speed of a gear type foam pump. Varying the speed of the foam pump shall result in the varying of the foam pressure delivered by the foam pump. The varying pressure shall be precisely controlled and matched to the operational water pressure in the pumping system at a given time. The resultant balance shall be the basis for proportioning of foam concentrate into water by way of the metered venturi balance

pressure method. Energizing the foam pressure manager shall start the foam system in the automatic pressure balance mode. The foam proportioning shall not impose an electrical load on the vehicle electrical system any greater than five (5) amps at 12VDC.

The foam pressure control system shall feature a manual override system. The manual override shall consist of a change over valve and manual control proportional valve. The manual override valves shall be mounted to the control panel. The manual override system shall operate without any electrical power and override the electronic system at any time that the changeover valve is moved to the manual position. An analog differential pressure gauge that displays the foam/water pressure balance shall be provided and placed near the manual controls. This gauge shall be centered in its display when the foam/water pressures are equal and shall move to one side or the other when the pressures are unequal.

345. HYDRAULIC DRIVE SYSTEM

The foam concentrate pump shall be powered by a hydraulic drive system, which is PTO driven and activated by a PTO switch in the cab. A hydraulic oil reservoir shall be provided with a maximum of five (5) gallons. The reservoir shall be located to facilitate checking oil level or adding oil without spillage or the need to remove access panels. A hydraulic oil cooler shall be provided to automatically prevent overheating of the hydraulic oil, which is detrimental to system components. An oil cooler shall be provided so as to allow continuous system operation without allowing hydraulic oil temperature to exceed 180 degrees Fahrenheit.

A system relief valve shall be provided which is designed to protect drive system components and prevent over pressuring the foam concentrate pump. The relief valve shall not come in contact with foam concentrate, which can cause clogging.

346. FOAM CONCENTRATE PUMP

An Edwards Manufacturing Model 20 foam pump shall be supplied. The foam concentrate pump shall be of positive displacement self-priming spur gear design, driven by a hydraulic motor. The pump shall be constructed of bronze body, gears, and cover plates, stainless steel shafts, with bronze sleeve bearings to support the gear shafts.

The foam concentrate pump shall have minimum capacity for 30 gpm at 250 psi for an indefinite period of operation with all types of foam concentrates with a viscosity below 3200 cps including protein, fluoroprotein, AFFF, FFFP, or AR-AFFF. Specifically, the foam concentrate pump shall be able to accurately deliver Mil-Spec F24385F 3% AFFF, National Foam Universal Gold 1x3 alcohol resistant concentrate, and Williams Thunderstorm 1x3 alcohol resistant concentrate. The system shall deliver only the amount of foam concentrate flow required, without recirculating foam back to the storage tank. The foam concentrate pump shall be self-priming and have the ability to continuously draw foam concentrate from external supplies such as totes, drums or pails.

347. EXTERNAL FOAM CONCENTRATE CONNECTIONS

An external concentrate connection with a ball valve having 1.50" National Standard female swivel thread shall be provided, equipped with a chromed plug and chain. The connection shall be located on the driver

side pump panel. This connection shall permit the uninterrupted, continuous external pick-up of foam concentrate. A six foot long, 1.50" flexible suction tube with 1.50" male NS threads at both ends shall be provided and shipped loose.

A 1.50" male NST concentrate discharge connection shall be included. The discharge shall be located on the driver's side control panel, and will be supplied by the foam pump to allow foam concentrate to be pumped off of the vehicle. A chromed cap and chain shall be provided.

348. STRAINER

No strainers, filters, or screens shall be installed in the plumbing from the foam tank to the foam pump inlet port, or from the foam pump to the metering valves at each discharge. A domed strainer with an open cross-sectional area at least six times larger than the internal cross-sectional area of the foam tank-to-pump plumbing shall be permitted at the sump of the foam tank to prevent large debris from entering the foam pump. The domed strainer shall be accessible for direct visual inspection and cleaning (with long handled tools or similar) via the fill tower for the foam tank.

349. FLUSH SYSTEM

A system flush shall be provided to allow the system to flush all foam concentrate from the foam piping system, including the foam pump, with clear water. A control shall be provided inside the passenger side pump panel area, behind an access door. The flush valve shall have ON and OFF indicator LEDs on the pump panel, near the foam system controls.

The flush system shall not discharge or backflow into the foam concentrate tank.

350. FOAM TANK FILL

A foam tank fill valve shall be provided that is connected to the foam concentrate manifold system. The gateable tank fill valve will allow for the refilling of the foam tank by way of the foam pump. The tank fill valve shall be an electrically controlled 1.50" valve, with a five light LED position indicator for the valve. The tank fill plumbing shall terminate at the bottom of the foam tank and be designed to minimize turbulence and sloshing of the foam concentrate to prevent aeration inside the tank to the greatest extent possible.

351. FOAM CONCENTRATE METERING VALVES

An individual adjustable metering valve shall control foam concentrate at each foam discharge connection. The valve shall be manually operated and infinitely adjustable from 1 percent to 6 percent. The valve shall include full 360 degree scale indicator plate with an adjustable metal pointer to indicate concentrate rate. The valve shall have the ability to be externally recalibrated to suit new types of foam concentrates without the need to disassemble the valve or remove it from the vehicle.

352. RATIO FLOW PROPORTIONER

Each foam discharge connection shall be provided with an individual proportioner, with a solution capacity equal to the maximum capacity of the discharge. A check valve shall be provided upstream of each ratio controller in the foam concentrate piping to ensure that water cannot back flow into the foam concentrate supply, from a ratio controller.

353. FOAM METERING AND RATIO CONTROL

All discharges, with the exception of the deluge monitor, shall be provided with foam capabilities. **There are no exceptions to this requirement**.

The following eleven (11) discharges are **required** to have foam capabilities:

- Bumper turret (with automatic control from the cab)
- One front bumper 1.50" discharge
- Three (3) crosslays – two (2) 1.50" and one (1) 2.50"
- Two left-side 2.50" discharges
- One right-side 2.50" discharge
- One right-side 4.00" discharge
- Two rear 2.50" discharges

The metering valves shall be a needle valve design which incorporates epicyclic gearing in the control knob to allow for extremely accurate calibration and vibration stability. The metering valve that supplies the ratio controller shall be of brass, stainless steel and Delrin construction.

The bumper turret and two rear 2.50" discharges shall each have the ability to maintain at least 500 gpm of foam solution at a 3% concentrate proportioning rate. The 4.00" discharge shall have the ability to maintain at least 1000 gpm of foam solution at a 3% concentrate proportioning rate. The front bumper 1.50" and 1.50" crosslay discharges shall have the ability to maintain 150 gpm of foam solution at a 3% concentrate proportioning rate. All other discharges shall have the ability to maintain at least 250 gpm of foam solution at a 3% concentrate proportioning rate.

If necessary, a blocking valve may be installed in the metering valve discharge line to the bumper turret to allow the metering valve to discharge foam concentrate at a preset ratio and volume.

If installed, the blocking valve shall be actuated by a pneumatic actuator, with a guarded pneumatic switch on the pump operator's panel. The blocking valve shall also automatically open when the bumper turret is utilized from inside the cab during foam operations.

The blocking valve control shall include open (green) and closed (red) LED indicator lights to alert the operator of the position of the blocking valve.

354. FOAM TANK

The foam tank shall be securely mounted ahead of the hose bed and shall have a capacity of 250 gallons with the intended use of Class B foam. The brand of foam stored in this tank shall be 3% AFFF compliant with Mil-Spec F24385F, however the tank shall also provide for storage of National Foam Universal Gold 1x3 alcohol resistant as an alternate concentrate (concentrates shall not be stored concurrently). The tank construction shall be of 0.50" polypropylene plastic with joints and seams nitrogen welded inside and outside. The fill tower shall be 8.00" square and contain a screen and nonfoaming 4.00" diameter bottom fill tube.

The foam tank fill tower shall have a hinged door with a firm mechanical locking device. The inside of the hinged door shall be gasketed to provide an air-tight seal between the door and the fill tower. A pressure-vacuum vent shall be provided to allow foam concentrate to enter and exit the foam tank without over-pressurizing or creating a vacuum on the tank interior. The gasket material, and any adhesive used to attach the gasket to the door, shall be compatible with the liquid and vapors emanating from foam concentrates complying with Mil Spec F24385F.

A fitting at the top of the foam tank, as close to the deluge riser as possible, shall be installed to allow foam concentrate to be withdrawn from the tank by the self-educting deluge nozzle. The fitting shall have a 1.50” male cam-lock fitting to connect to the deluge nozzle concentrate pickup tube, and have an air-tight 1.50” female cam-lock cap. The port shall connect to a tube within the foam tank that terminates as close to the bottom of the tank as possible, while allowing a 30 gallon per minute withdrawal rate through the tube. The tube shall have a minimum internal diameter of 2.00 inches.

Should any drilling, cutting, or other work that leaves any type of residue be done on the foam tank, the inside of the tank, including the sump and any screens or filters, shall be thoroughly inspected to ensure that it is free of cuttings, shavings, turnings, or any other materials that may clog the foam system.

Any components used in the construction of the foam tank, including seals or gaskets of any kind, shall be constructed of materials that are compatible with foam concentrates. Aluminum, mild steel, galvanized pipe, or Schedule 40 or thinner poly vinyl chloride pipe shall not be used in any portion of the foam system that is in contact with foam concentrate.

355. FOAM TANK DRAIN AND BOTTOM FILL

The foam tank drain and bottom fill shall be a 1.50" valve located on the passenger's side pump panel. The drain valve shall terminate in a Banjo model DM150ASS 1-1/2” 316 stainless steel male dry mate valve with EPDM seals and an appropriate cap with chain/restraining cable attached to the pump panel.. The dry mate valve shall be permitted to be used as the drain valve. This valve may extend beyond the pump panel, but in no circumstances shall any portion of the valve protrude beyond the body of the vehicle.

Any materials used in the construction of the foam tanks drain or bottom fill, including seals or gaskets of any kind, shall be constructed of materials that are compatible with foam concentrates. Aluminum, mild steel, galvanized pipe, or glued Schedule 40 or thinner poly vinyl chloride pipe shall not be used in any portion of the foam system that is in contact with foam concentrate

356. FOAM LEVEL GAUGES

An electronic foam level gauge shall be provided on the operator's panel and a mini level gauge shall be located in the cab on the dash. Foam levels shall be indicated by means of five (5) durable, ultra-bright LED lights. The lights shall be durable, ultra-bright five LED design viewable through 180 degrees. The foam level indicators shall be as follows:

- 100% = Green
- 75% = Yellow
- 50% = Yellow
- 25% = Yellow
- Empty = Red

The light shall flash when the level drops below the given level indicator to provide an eighth-of-a-tank indication. To further alert the pump operator, the lights shall flash sequentially downwards when the foam tank is empty.

The level measurement shall be ascertained by sensing the head pressure of the fluid in the tank. Systems that utilize floats or wetted switches shall not be acceptable.

The display shall be constructed of a solid plastic material with a chrome plated die cast bezel to reduce vibrations that can cause broken wires and loose electronic components. The encapsulated design shall provide complete protection from foam concentrate, water, and environmental elements. An industrial pressure transducer shall be mounted to the outside of the tank. The display shall be able to be calibrated in the field and shall measure head pressure to accurately show the tank level.

Any component of the foam level gauge system that contacts foam concentrate shall not be degraded by foam concentrate, or harm the concentrate stored in the foam tank or proportioning system.

12 VOLT DIRECT CURRENT WIRING AND LIGHTING

357. ELECTRICAL HARNESS INSTALLATION

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

- SAE J1128 - Low tension primary cable
- SAE J1292 - Automobile, truck, truck-tractor, trailer and motor coach wiring
- SAE J163 - Low tension wiring and cable terminals and splice clips
- SAE J2202 - 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 J1939 - Serial communications protocol
- SAE J2030 - Heavy-duty electrical connector performance standard
- SAE J2223 - Connections for on board vehicle electrical wiring harnesses
- NEC - National Electrical Code
- SAE J561 - Electrical terminals - Eyelet and spade type
- SAE J928 - 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 shall not be allowed.

Wiring shall be run in loom or conduit where exposed, and have grommets or other edge protection where wires pass through metal. Wiring shall be color, function and number coded. 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 2.00" intervals. All wiring installed between the cab and into doors shall be protected by an expandable rubber boot to protect the wiring. Exterior exposed wire connectors shall be positive locking, and environmentally sealed to withstand elements such as temperature extremes, moisture, automotive fluids, and firefighting agents. Electrical wiring and equipment shall be installed utilizing the following guidelines:

1. All wire ends not placed into connectors shall be sealed with a heat shrink end cap. Wires without a terminating connector or sealed end cap shall not be allowed.

2. All holes made in the roof shall be caulked with silicone. Large fender washers, liberally caulked, shall be used when fastening equipment to the underside of the cab roof.

3. 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.

4. 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.

5. 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.

6. Any lights containing non-waterproof sockets in a weather-exposed area shall have corrosion preventative compound added to the socket terminal area.

7. All electrical terminals in exposed areas shall have Dow 1890 protective coating applied completely over the metal portion of the terminal.

8. Rubber coated metal clamps shall be used to support wire harnessing and battery cables routed along the chassis frame rails.

9. Heat shields shall be used to protect harnessing in areas where any high temperatures that may cause damage or unintended operation of the wiring or component(s) exist. Harnessing passing near the engine exhaust shall be protected by a heat shield.

10. 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.

11. All braided wire harnesses shall have a permanent label attached for easy identification of the harness part number and fabrication date.

12. All standard wiring entering or exiting the cab shall be routed through sealed bulkhead connectors to protect against water intrusion into the cab.

358. BATTERY CABLE INSTALLATION

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

- SAE J1127 - Battery Cable
- SAE J561 - Electrical terminals, eyelets and spade type
- SAE J562 - Nonmetallic loom
- SAE J836A - Automotive metallurgical joining
- SAE J1292 - 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:

1. All battery cables and battery harnesses shall have a permanent label attached for easy identification of the harness part number and fabrication date.

2. Splices shall not be allowed on battery cables or battery cable harnesses.

3. For ease of identification and simplified use, battery cables shall be color coded. All positive battery cables shall be red in color or wrapped in red loom the entire length of the cable. All negative battery cables shall be black in color.

4. For ease of identification, all positive battery cable isolated studs throughout the cab and chassis shall be red in color.

5. For increased reliability and reduced maintenance, all electrical buss bars located on the exterior of the apparatus shall be coated to prevent corrosion.

359. ELECTRICAL COMPONENT INSTALLATION

All lighting used on the apparatus shall be, at a minimum, a two (2) wire light, grounded through a wired connection to the battery system. Lights using an apparatus metal structure for grounding shall not be allowed.

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. The results of the tests shall be recorded and provided to RIAC at time of delivery.

360. REAR CLEARANCE/MARKER/ID LIGHTING

There shall be three (3) Truck-Lite, Model 26250R, LED lights used as identification lights located at the rear of the apparatus per the following:

- As close as practical to the vertical centerline
- Centers spaced not less than 6.00" or more than 12.00" apart
- Red in color
- All at the same height
- Mounted as high as practical at the rear of the truck
- Recessed or otherwise protected from damage by hose from the hose bed.

There shall be two (2) Truck-Lite, Model 26250R, LED lights installed at the rear of the apparatus used as clearance lights located at the rear of the apparatus per the following:

- To indicate the overall width of the vehicle
- One (1) each side of the vertical centerline
- As near the top as practical
- Red in color
- To be visible from the rear
- All at the same height

- Mounted in a stainless steel bracket with the Rear Upper Warning Lights

There shall be two (2) Truck-Lite, Model 26250R, LED lights installed on the side of the apparatus as marker lights as close to the rear as practical per the following:

- To indicate the overall length of the vehicle
- One (1) each side of the vertical centerline
- As near the top as practical
- Red in color
- To be visible from the side
- All at the same height

There shall be two (2) red reflectors located on the rear of the truck facing to the rear. One (1) each side, as far to the outside as practical, at a minimum of 15.00", but no more than 60.00", above the ground.

There shall be two (2) red reflectors located on the side of the truck facing to the side. One (1) each side, as far to the rear as practical, at a minimum of 15.00", but no more than 60.00", above the ground, per FMVSS 108.

361. REAR FMVSS LIGHTING

There shall be two (2) wrap around tri-cluster LED modules provided on the face of the rear body compartments.

Each tri-cluster shall include the following:

- One (1) LED stop/tail light (red)
- One (1) LED directional light (amber)
- One (1) LED backup light (white)

362. LICENSE PLATE BRACKETS

One (1) license plate bracket constructed of stainless steel shall be provided at the rear of the apparatus.

One (1) white LED light shall be provided to illuminate the license plate. A polished stainless steel light shield shall be provided over the light that shall direct illumination downward, preventing white light to the rear.

One (1) license plate bracket constructed of stainless steel shall be provided at the front of the apparatus beneath the front bumper. No lighting is required for this bracket.

363. INTERMEDIATE LIGHT

There shall be one (1) pair, of Truck-Lite, Model 60115Y, amber, LED, turn signal, marker lights furnished, one (1) each side, horizontally in the rear fender panel.

A stainless steel trim shall be included with this installation.

364. CAB PERIMETER SCENE LIGHTS

There shall be four (4) Truck-Lite, Model 40227C, 4.00" white incandescent lights, with Model 40700 grommets provided.

The lights shall be installed under the driver, officer, and crew cab riding area exits.

These lights shall be activated automatically when the battery switch is on and the exit doors are opened, or by the same means as the body perimeter scene lights.

An LED light installation may be entertained in place of the Truck-Lite lights specified, with the approval of RIAC.

365. BODY PERIMETER SCENE LIGHTS

There shall be four (4) Truck-Lite, Model 40227C, 4.00" white incandescent lights with Model 40700, grommets provided.

The lights shall be mounted in the following locations:

• One (1) light shall be provided under the driver's side pump panel running board.

• One (1) light shall be provided under the driver's side rear step area shining to the rear.

• One (1) light shall be provided under the passenger's side rear step area shining to the rear.

• One (1) light shall be provided under the passenger's side pump panel running board.

The perimeter scene lights shall be activated when the parking brake is applied.

An LED light installation may be entertained in place of the Truck-Lite light specified, with the approval of RIAC.

366. STEP LIGHTS

There shall be two (2) white LED step lights shall be provided at the rear to illuminate the tailboard/step area.

In order to ensure sufficient illumination, each light shall provide a minimum of 25 foot-candles (fc) covering an entire 15" x 15" square placed ten (10) inches below the light and a minimum of 1.5 fc covering an entire 30" x 30" square at the same ten (10) inch distance below the light.

These step lights shall be actuated with the perimeter scene lights.

All other steps on the apparatus shall be illuminated per the current edition of NFPA 1901.

367. 12 VOLT FRONT SCENE LIGHTING

There shall be two (2) Whelen Pioneer, Model PCP2, 12 volt LED combination spot/flood light(s) provided on the front visor, one (1) on the driver's side and one (1) on the passenger's side.

The painted parts of these light assemblies are to be white.

The light(s) shall be controlled by the following:

- A switch at the driver's side switch panel (both lights together)
- A switch at the passenger's side switch panel (both lights together).
- A switch at the pump operator's panel (both lights together).

These light(s) may be load managed when the parking brake is set.

368. 12 VOLT SIDE SCENE LIGHTING

There shall be four (4) Whelen Model PCP2, 12 volt DC LED combination spot/floodlight(s) installed on the apparatus body, two (2) each on the left and right hatch compartments.

The lights shall be recessed-mounted, with flange, at the front and rear of the hatch compartments to illuminate the areas to the left and right sides of the vehicle. One light shall be provided as close to the front of the body as practical, and one as far back as practical. Both lights on each side shall be switched together.

The lights shall be controlled by the following:

- Two switches at the driver's side switch panel (left and right scene lights).
- Two switches at the pump operator's panel (left and right scene lights)
- Two switches at the passenger's side switch panel (left and right scene lights)

These lights may be load managed when the parking brake is applied.

369. SIDE WORK LIGHTS

Two (2) Whelen, Model 60F000*U scene lights shall be installed, one (1) each left and right sides on the crew cab extensions, above the external water tank level lights.

These lights shall have a 13 degree internal optics to redirect light downward.

The lights shall be controlled by the following:

- A switch at the driver side switch panel (both lights together)
- A switch at the officer side switch panel (both lights together)
- A switch at the pump panel (both lights together)
- When the parking brake is set and any cab door is open (both lights together)

These lights shall be installed with a chrome flange.

370. HOSE BED LIGHTING

There shall be four Amdor Lumabar or equivalent style LED light modules attached to the underside of the hose bed covers, two on each cover, aimed appropriately to illuminate the hose bed when the doors are in the open position. The light intensity shall be sufficient to adequately illuminate the hose bed to allow personnel to operate safely in that area.

The hose bed lighting shall be activated by a recessed switch on the rear of the truck, mounted at chest height on the left side of the rear bulkhead, adjacent to the rear work lights switch.

371. REAR WORK LIGHTS

There shall be one (1) pair of Whelen, Model PELCC white 12 volt DC LED scene lights installed at the rear of the body to the outside of the rear compartment. The lights shall be directed down ward by a 45 degree angle and mounted with a chrome flange.

The lights shall be controlled by a control from the following locations:

- A recessed switch at the rear of the truck, chest height, left side
- When the transmission is placed in “reverse.”
- From a switch at the driver’s side control panel

372. MOUNTED FLASH LIGHTS

There shall be four (4) 12vac Streamlight, Fire Vulcan, Model #44450, lights mounted two (2) on the rear wall of crew cab adjacent to the doors, and two (2) on the engine tunnel between driver and officer. The exact locations will be determined during the Preconstruction Conference.

Each light housing shall be orange in color and be provided with a C4 LED and two (2) "ultra-bright blue tail light LEDs" The tail light LEDs shall have a dual mode of blinking or steady.

The hand light(s) shall be connected to 12 volt DC power, arranged to charge the hand lights when the truck is turned off in the fire station, as well as when the vehicle is running.

Quick release buckle strap shall be included.

373. AIR HORN SYSTEM

Two (2) Grover Stuttertone air horns shall be provided and located in the front bumper, recessed, and evenly spaced. The horn system shall be piped to the air brake system wet tank utilizing 0.38" tubing. A pressure protection valve shall be installed in-line to prevent loss of air in the air brake system.

374. AIR HORN CONTROL

Two (2) lanyard rope pull controls shall be provided, one (1) within reach of the driver and one (1) within reach of the officer.

375. ELECTRONIC SIREN

A Code 3, Model 3692, electronic siren with noise canceling microphone shall be provided.

This siren is to be active when the battery switch is on and the emergency master switch is on.

The electronic siren head shall be recessed in the center switch panel, favoring the driver’s side.

Siren shall be actuated by a push button on the officer's side, located as per the Preconstruction Conference, and by the horn button in the steering wheel. The driver shall have the option to control the siren or the chassis horns from the steering wheel horn button by means of a selector switch.

376. SPEAKER

There shall be one (1) speaker, Code 3, Model PB100C, with chrome finish provided. The siren speaker shall be connected to the siren amplifier/control head.

The speaker shall be recessed in the front bumper on the left side.

377. AUXILIARY MECHANICAL SIREN

A Federal Q2B siren shall be furnished. A siren brake button shall be installed on the driver’s side switch panel.

The control solenoid shall be powered up after the emergency master switch is activated.

The mechanical siren shall be recessed in the front bumper on the right side. The siren shall be supported by the bumper framework.

378. MECHANICAL SIREN CONTROL

The mechanical siren shall be actuated by a push button located on the officer's side instrument panel, located as per the Preconstruction Conference. The driver’s side control shall be via a foot switch mounted on the engine tunnel so that it can be activated by the driver’s knee, also located as per the Preconstruction Conference.

379. CAB ROOF LIGHT BAR

There shall be one (1) 72.00" Whelen Freedom, Model: FN**QLED light bar mounted on the cab roof.

This light bar shall include the following:

- Two (2) red flashing forward facing LED modules.

- Two (2) white flashing forward facing LED modules.
- Two (2) red flashing front corner LED modules.
- One (1) red flashing driver side facing LED module.
- One (1) red flashing officer side facing LED module.
- Two (2) red flashing rear corner LED modules

There shall be a switch located in the cab on the switch panel to control the light bar.

The color of the lenses shall be the same color as the LED's.

The white LED lights shall be deactivated when the parking brake is applied.

380. ADDITIONAL CAB ROOF LIGHT BARS

There shall be two (2) Code 3 Defender, model DF23A2 with 8 TriCore TC6 with no alley light light bars mounted on the cab roof, located one (1) each side on the high crew cab roof, mounted with the long axis of the truck.

The LED assemblies shall each be red and amber, with clear lenses. The top cover of the light bars shall be red. The light bar shall have two modes of operation: all amber LEDs flashing, and all red LEDs flashing.

The amber LEDs in both light bars shall automatically activate with the ignition switch. A switch at the driver's side switch panel shall be installed to allow the driver to turn the amber LEDs off and on as desired. The goal of this wiring is to have the amber LEDs in both light bars activate whenever the truck is started, without the driver having to manually activate them.

The red LEDs in both light bars shall turn on with the emergency master and primary light bar. The amber LEDs in both light bars shall turn off when the emergency master switch is activated, and shall turn back on when the emergency master switch is deactivated.

Installation of other light bar brands may be acceptable, provided the amber/red coloring and switching logic is still provided. Bidders shall identify other brands or models in the "Exceptions" document.

381. CAB FACE WARNING LIGHTS

There shall be four (4) Whelen, Model 60*02F*R, LED lights installed on the cab face, two (2) above each headlight pair, installed in double-opening common flanges to match the headlight flange beneath.

The color of these LEDs shall be red SuperLED with a red lens.

There shall be a switch located in the cab on a driver's side switch panel to control the lights, and they shall turn on with the emergency master switch.

382. SIDE ZONE LIGHTING

There shall be eight (8) Whelen, Model 60*02F*R, flashing LED warning lights located in the following positions:

- Two (2) lights, one (1) each side on the bumper extension. The color of these lights shall be red Super LED/red lens each side
- Two (2) lights, one (1) centered over each rear wheel. The color of these lights shall be red Super LED/red lens each side
- Four (4) lights, two (2) each side on the side of the hatch compartments adjacent to the Whelen PCP2 spot/flood lights. The forward warning light shall be installed forward of the front PCP2 light, and the rear warning light shall be installed rearward of the rear PCP2 light.

These lights shall be installed with a flange.

There shall be a switch located in the cab on a driver's side switch panel to control the lights, and they shall turn on with the emergency master switch.

383. REAR ZONE LOWER LIGHTING

There shall be two (2) Whelen, Model 60*02F*R, flashing LED warning lights located at the rear of the apparatus.

The color of these lights shall be red Super LED with a red lens.

These lights shall be installed with a flange.

There shall be a switch in the cab on driver's side switch panel to control these lights, and they shall turn on with the emergency master switch.

384. REAR ZONE UPPER LIGHTING

Two (2) Whelen model: MCSLED2R, LED warning beacons shall be provided at the rear of the truck, located one (1) each side. There shall be a switch located in the cab on a driver's side switch panel to control the beacons, and they shall turn on with the emergency master switch.

The color of the lights shall be red LEDs with both domes red.

The rear warning lights shall be mounted on stainless steel brackets with all wiring totally enclosed. These brackets shall also support the clearance/marker lights.

385. 12 VOLT CAB INTERIOR RECEPTACLES

There shall be five (5) 12 volt power outlet receptacles compliant with ANSI/SAE J563 provided in the cab.

The receptacles shall be installed in the following locations:

- Two (2) on the engine cowling, adjacent to the driver
- Two (2) on the engine cowling, adjacent to the officer
- One (1) Adjacent to the dashboard work surface in front of the officer's seating position.

The circuit(s) may be load managed when the parking brake is applied.

These five (5) receptacles shall be directly wired to the battery, or be supplied with power when the truck and battery are in the "off" mode.

386. USB CAB RECEPTACLE

One (1), two-port USB3.0, 2.1 amp (minimum per receptacle) receptacle shall be installed adjacent to the dash work area in front of the officer's seat, to simultaneously supply an iPad and one additional device. The specific location shall be decided during the Preconstruction Conference. This receptacle shall be directly wired to the battery, or be supplied with power when the truck and battery are in the "off" mode.

ALTERNATING CURRENT ELECTRICAL SYSTEM

387. GENERAL

Any fixed line voltage power source producing alternating current (ac) line voltage shall produce electric power at 60 cycles plus or minus 3 cycles.

Except where superseded by the requirements of NFPA 1901, all components, equipment and installation procedures shall conform to NFPA 70, *The National Electrical Code* (herein referred to as the NEC).

Line voltage electrical system equipment and materials included on the apparatus shall be listed and installed in accordance with the manufacturer's instructions. All products shall be used only in the manner for which they have been listed.

388. GROUNDING

Grounding shall be in accordance with Article 250.34, "Portable and Vehicle Mounted Generators" of the NEC. Ungrounded systems shall not be used. Only stranded or braided copper conductors shall be used for grounding and bonding.

All equipment grounding means shall be provided in accordance with Article 250 of the NEC.

The grounded current carrying conductor (neutral) shall be insulated from the equipment grounding conductors and from the equipment enclosures and other grounded parts. The neutral conductor shall be colored white or gray in accordance with Article 200.6 (Means of Identifying Grounding Conductors) of the NEC.

In addition to the bonding required for the low voltage return current, each body and driving or crew compartment enclosure shall be bonded to the vehicle frame by a copper conductor. This conductor shall have a minimum amperage rating of 115 percent of the nameplate current rating of the power source specification label as defined in Article 310.15 (Ampacities for Conductors Rated 0-2000 volts) of the NEC. A single conductor properly sized to meet the low voltage and line voltage requirements shall be permitted to be used.

All power source system mechanical and electrical components shall be sized to support the continuous duty nameplate rating of the power source.

389. OPERATION

Instructions that provide the operator with the essential power source operating instructions, including the power-up and power-down sequence, shall be permanently attached to the apparatus at any point where such operations can take place.

Provisions shall be made for quickly and easily placing the power source into operation. The control shall be marked to indicate when it is correctly positioned for power source operation. Any control device used

in the drive train shall be equipped with a means to prevent the unintentional movement of the control device from its set position.

A power source specification label shall be permanently attached to the apparatus near the operator's control station. The label shall provide the operator with the information detailed in Figure 22.4.9 of NFPA 1901.

The generator installation and operation shall comply with Article 445 (Generators) of the NEC.

390. OVERCURRENT PROTECTION

The conductors used in the power supply assembly between the output terminals of the power source and the main over current protection device shall not exceed 144.00" in length.

For fixed power supplies, all conductors in the power supply assembly shall be type THHW, THW, or use stranded conductors enclosed in nonmetallic liquid tight flexible conduit rated for a minimum of 194 degree Fahrenheit (90 degrees Celsius).

For portable power supplies, conductors located between the power source and the line side of the main overcurrent protection device shall be type SO or type SEO with suffix WA flexible cord rated for 600-volts at 194 degrees Fahrenheit (90 degrees Celsius).

391. WIRING METHODS

Fixed wiring systems shall be limited to the following:

• Metallic or nonmetallic liquid tight flexible conduit rated at not less than 194 degrees Fahrenheit (90 degrees Celsius), or;

• Type SO or Type SEO cord with a WA suffix, rated at 600 volts at not less than 194 degrees Fahrenheit (90 degrees Celsius)

Electrical cord or conduit shall not be attached to chassis suspension components, water or fuel lines, air or air brake lines, fire pump piping, hydraulic lines, exhaust system components, or low voltage wiring. In addition, the wiring shall be run as follows.

• Separated by a minimum of 12.00", or properly shielded, from exhaust piping

• Separated from fuel lines by a minimum of 6.00" distance

Electrical cord or conduit shall be supported within 6.00" of any junction box and at a minimum of every 24.00" of continuous run. Supports shall be made of nonmetallic materials or corrosion protected metal. All supports shall be of a design that does not cut or abrade the conduit or cable and shall be mechanically fastened to the vehicle.

392. WIRING IDENTIFICATION

All line voltage conductors located in the main panel board shall be individually and permanently identified. The identification shall reference the wiring schematic or indicate the final termination point. When prewiring for future power sources or devices, the unterminated ends shall be labeled showing function and wire size.

393. WET LOCATIONS

All wet location receptacle outlets and inlet devices, including those on hardwired remote power distribution boxes, shall be of the grounding type provided with a wet location cover and installed in accordance with Article 314.15, (Damp or Wet Locations) of the NEC.

All receptacles located in a wet location shall be not less than 24.00" from the ground.

The face of any wet location receptacle shall be installed in a plane from vertical to not more than 45 degrees off vertical. No receptacle shall be installed in a face up position.

394. DRY LOCATIONS

All receptacles located in a dry location shall be of the grounding type. Receptacles run from the on-board alternating current power supply shall be not less than 30.00” above the interior floor height.

All receptacles shall be marked with the type of line voltage (120-volts or 240-volts) and the current rating in amps. If the receptacles are direct current, or other than single phase, they shall be so marked.

395. LISTING

All receptacles and electrical inlet devices shall be listed to UL 498, *Standard for Safety Attachment Plugs and Receptacles*, or other appropriate performance standards. Receptacles used for direct current voltages shall be rated for the appropriate service.

396. ELECTRICAL SYSTEM TESTING

The wiring and associated equipment shall be tested by the apparatus manufacturer or the installer of the line voltage system.

The wiring and permanently connected devices and equipment shall be subjected to a dielectric voltage withstand test of 900-volts for one (1) minute. The test shall be conducted between live parts and the neutral conductor, and between live parts and the vehicle frame with any switches in the circuit(s) closed. This test shall be conducted after all body work has been completed.

Electrical polarity verification shall be made of all permanently wired equipment and receptacles to determine that connections have been properly made.

397. OPERATIONAL TESTING PER NFPA 1901

The apparatus manufacturer shall perform the following operation test and ensure that the power source and any devices that are attached to the line voltage electrical system are properly connected and in working order. The test shall be witnessed and the results certified by an independent third-party certification organization.

The generator hydraulic power supply shall be started from a cold start condition and the line voltage electrical system loaded to 100 percent of the nameplate rating.

The power source shall be operated at 100 percent of its nameplate voltage for a minimum of two (2) hours unless the system meets category certification as defined in NFPA 1901.

Where the line voltage power is derived from the vehicle's low voltage system, the minimum continuous electrical load as defined in NFPA 1901 shall be applied to the low voltage electrical system during the operational test.

398. GENERATOR

The apparatus shall be equipped with a complete electrical power system. The generator shall be a Harrison Model MCR Stealth 10.0 kW Hydraulic unit. The wiring and generator installation shall conform to the present *National Electrical Code* requirements. The installation shall be designed for continuous operation without overheating and undue stress on components.

Generator Performance

- Continuous Duty Rating: 10,000 watts
- Nominal Volts: 120/240
- Amperage: 80 @ 120 volts, 40 @ 240 volts
- Phase: Single
- Cycles: 60 hertz
- Engine Speed at Engagement: Idle
- RPM range: 900 to 3,000 (hydraulic pump)

The output of the generator shall be controlled by an internal hydraulic system. An electrical instrument gauge panel shall be provided for the operator to monitor and control all electrical operations and output.

The generator shall be driven by a transmission power take off unit, through a hydraulic pump and motor.

The generator shall include an electrical control inside the cab. The hydraulic engagement supply shall be operational at any time. No interlocks with the transmission or parking brake shall be permitted.

An electric/hydraulic valve shall supply hydraulic fluid to the clutch engagement unit provided on the chassis PTO drive.

399. GENERATOR INSTRUMENTS AND CONTROLS

To properly monitor the generator performance a digital meter panel shall be furnished and mounted next to the circuit breaker panel. The meter shall indicate the following items:

- Voltage
- Amperage for both lines
- Frequency
- Generator run hours
- Over current indication
- Over temperature indication
- "Power On" indication
- Two (2) fuse holders with two (2) amp fuses (for indicator light protection)

The meter and indicators shall be installed near eye level in the compartment. Instruments shall be flush mounted in an appropriate sized weatherproof electrical enclosure. All instruments used shall be accurate within +/- two (2) percent.

400. GENERATOR WIRING

The system shall be installed by highly qualified electrical technicians to assure the required level of safety and protection to the fire apparatus operators. The wiring, electrical fixtures and components shall be to the highest industry quality standards available on the domestic market.

The equipment shall be the type as designed for mobile type installations subject to vibration, moisture and severe continuous usage. The following electrical components shall be the minimum acceptable quality standards for this apparatus:

401. WIRING

All electrical wiring shall be fine stranded copper type. The wire shall be sized to the load and circuit breaker rating; ten (10) gauge on 30 amp circuits, 12 gauge on 20 amp circuits and 14 gauge on 15 amp circuits. The cable shall be run in corner areas and extruded aluminum pathways built into the body for easy access.

402. LOAD CENTER/CIRCUIT BREAKER PANEL

The main load center/circuit breaker panel shall be a Cutler Hammer with circuit breakers rated to load demand. The panel shall be located in the Driver’s Side Compartment 3 on the front bulkhead wall as high as possible.

403. CIRCUIT BREAKERS

Individual breakers shall be provided for all on-line equipment to isolate a tripped breaker from affecting any other on-line equipment.

Any circuit breaker that protects a receptacle or cord reel shall be of the Ground Fault Circuit Interrupter (GFCI) type.

404. GENERATOR LOCATION

The generator shall be permanently mounted in the forward area of the driver's side hatch compartment. Proper ventilation panels shall be provided as necessary.

405. GENERATOR START

There shall be a switch provided on the cab instrument panel to engage the generator.

406. ELECTRIC CORD REELS

Three (3) Hannay Series 1600, cord reels shall be provided and installed inside the hatch compartments. One reel shall be mounted above compartment Passenger 4. One reel shall be mounted above compartment Driver 1, and one reel shall be mounted above compartment Driver 3. The reels shall be provided with a 12 volt electric rewind switch that is guarded to prevent accidental operation and labeled for its intended use. The switches shall be protected with fuses and installed at a height between 60.00” and 72.00" above the operators standing position. The specific mounting location of the three switches shall be determined at the Preconstruction Conference.

The exterior finishes of the reel(s) shall capable of withstanding the conditions inside the hatch compartments. A plain finish is acceptable, provided it is capable of withstanding said conditions.

Captive roller assemblies shall be provided to aid in the payout and loading of the reels into the compartments below the mounted locations of the reels. A ball stop shall be provided on each cord to prevent the cords from being wound on the reel.

A label shall be provided in a readily visible location adjacent to each reel, indicating current rating, current type, phase, voltage and total cable length.

The cord reels shall be configured with three (3) conductors.

407. CORD

Provided for electric distribution shall be three (3) lengths, one (1) for each reel, of 200 feet of yellow 10/3 electrical cord, weather resistant 105 degree Celsius to -50 degree Celsius, 600 volt jacketed SOOW cord. A Hubbell L5-20, 20 amp, 120 volt, twist lock connector body shall be installed on the end of the cord.

408. 120 VOLT RECEPTACLE

One (1) 120 volt receptacle shall be provided in the cab, supplied by the generator. The receptacle shall be a NEMA 5-15R, 120 volt, 15 amp, three (3) wire duplex household type with a non-weather resistant cover. The receptacle plug surfaces shall be orange to distinguish it from other, non-generator supplied receptacles.

The receptacle shall be installed behind the officer’s seat, accessible from the crew cab.

409. 120 VOLT SHORELINE RECEPTACLES

Five (5) 120 volt, 15 amp, three (3) wire, four (4) outlet household type NEMA 5-15R receptacles shall be installed in the vehicle, three (3) in the cab and two (2) in body compartments, all connected to the shoreline in Section 232.

One (1) receptacle shall be provided in the EMS compartment on the rear wall approximately 6.0" from the ceiling.

One (1) receptacle shall be provided on the outside of the EMS compartment, in a location to be determined during the Preconstruction Conference.

One (1) receptacle shall be provided inside the meter compartment, on the rear wall approximately 6.00” from the bottom of the compartment.

One (1) receptacle shall be provided in compartment Passenger 4, mounted to the front bulkhead approximately 48.00” from the bottom of the compartment.

One (1) receptacle shall be provided in compartment Passenger 1, mounted to the front bulkhead approximately 48.00” from the bottom of the compartment.

LOOSE EQUIPMENT

410. SUPPLIED LOOSE EQUIPMENT

- One (1) bag of chrome, stainless steel, or cadmium plated screws, nuts, bolts and washers, as used in the construction of the unit shall be supplied to allow additional equipment to be mounted, or fasteners to be replaced, using hardware that matches that used on the vehicle.
- One female air fitting to properly mate with the vehicle's air system shoreline fill. The fitting shall be threaded for 1/4" NPT female on the inlet side.
- Cables and necessary software to connect the vehicle's Vehicle Data Recorder to a Windows-based laptop computer USB port.
- Cables and necessary software to connect the vehicle's Diagnostic System to a Windows-based laptop computer USB port.
- Cables and necessary software to connect the vehicle's Solid State Control System to a Windows-based laptop computer USB port.
- Cables and necessary software to connect the Digital Video Recorder to a Windows-based laptop computer USB port.
- One (1) Task Force Tips model YE-RF-900 wireless remote control for the deluge monitor and nozzle.
- One (1) Task Force Tips model A02HNX, 6.00" National Standard hose thread barrel strainer, black in color.

411. EQUIPMENT MOUNTING AND NFPA 1901 REQUIRED LOOSE EQUIPMENT

Mounting of the equipment listed in Appendix A, with the exception of hose and other equipment that does not require a mounting bracket, shall be provided by the manufacturer or the manufacturer’s authorized representative.

The loose equipment, required by NFPA 1901-5.9 Minor Equipment, shall be provided by RIAC, and **is not included in this specification.**

PAINTING AND LETTERING

412. PAINT, GENERAL

The exterior custom cab and body painting procedure shall consist of a seven (7) step finishing process as follows:

1. Manual Surface Preparation - All exposed metal surfaces on the custom cab and body shall be thoroughly cleaned and prepared for painting. Surfaces that shall not be painted include all chrome plated, polished stainless steel, anodized aluminum and bright aluminum tread plate. Each imperfection on the exterior metal surface shall be removed or filled and then sanded smooth for a smooth appearance. All seams shall be sealed before painting.

2. Chemical Cleaning and Treatment - The metal surfaces shall be properly cleaned using a high pressure and high temperature cleaning system. Surfaces are chemically cleaned to remove all dirt, oil, grease and metal oxides to ensure the subsequent coatings bond well. An ultra-pure water final rinse shall be applied to all metal surfaces at the conclusion of the metal treatment process.

3. Primer/Surfacer Coats - A two (2) component urethane primer/surfacer shall be hand applied to the chemically treated metal surfaces to provide a strong corrosion protective base coat and to smooth out the surface.

4. Hand Sanding - The primer/surfacer coat shall be lightly sanded to an ultra-smooth finish.

5. Sealer Primer Coat - A two (2) component sealer primer coat shall be applied over the sanded primer.

6. Topcoat Paint - Urethane base coat shall be applied to opacity for correct color matching.

7. Clear coat - Two (2) coats of an automotive grade two (2) component urethane shall be applied. Lap style doors shall be clear coated to match the body. Roll-up doors shall not be clear coated and the standard roll-up door warranty shall apply.

All removable items such as brackets, compartment doors, door hinges, trim, etc. shall be removed and painted separately to insure paint behind all mounted items. Body assemblies that cannot be finish painted after assembly shall be finish painted before assembly.

The cab will be two-tone, with the upper section painted white along with a shield design on the cab face and lower section of the cab and body painted safety lime yellow to match current T.F. Green Airport Fire-Rescue apparatus. The body will be painted safety lime yellow. Specific details of the paint design shall be confirmed during the Preconstruction Conference.

413. PAINT, FRONT WHEELS

All wheel surfaces, inside and outside, shall be provided with powder coat paint #40 lime yellow to match the body color.

414. PAINT, REAR WHEELS

All wheel surfaces, inside and outside, shall be provided with powder coat paint #40 lime yellow to match the body color.

415. COMPARTMENT INTERIOR FINISH

The interior of the body compartments shall be left unpainted and have a natural finish.

416. REFLECTIVE BANDS

A 10.00" white reflective band shall be provided across the front of the vehicle and along the sides of the body. Two (2) 1.00” wide white reflective bands shall be provided, offset 1.00” above and below the primary 10.00” white reflective band.

The reflective band provided on the cab face shall be below the headlights.

The specific location of the reflective band will be determined at the Preconstruction Conference.

417. CHEVRON STRIPING, REAR

There shall be alternating retroreflective chevron striping located on the rear-facing vertical surface of the apparatus. The entire rear surface, excluding the rear roll up door, shall be covered.

The colors shall be red and fluorescent yellow green, diamond grade.

Each stripe shall be 6.00" in width. .

418. REFLECTIVE STRIPE, CAB DOORS

A 6.00" x 16.00" red reflective stripe shall be provided across the interior of each cab door. The stripe shall be located approximately 1.00" up from the bottom, on the door panel.

419. REFLECTIVE STRIPES, SLIDE-OUT TRAYS AND TOOL BOARDS

Any tray or tool board that can extend outside of a compartment shall have a retro reflective alternating red/yellow or red/white chevron pattern, with 3.00” wide stripes, applied to the outer flange or frame, to make the tray or tool board as noticeable as possible as personnel operate around the vehicle.

420. LETTERING

The lettering shall be the following:

- “T.F. GREEN” on the cab face above the grille and below the windshield.
- The department’s patch (3-color) on the driver’s and officer’s door. Digital photos and measurements will be provided at the successful bidder’s request to match the patch design.
- “ENGINE” above the department patch on the driver’s and officer’s doors

- “4” below the department patch on the driver’s and officer’s doors.
- “T.F. GREEN AIRPORT” in two rows on the rear cab doors, both sides.
- A blue star of life, 12.00” high, on the panels aft of the rear crew cab doors, both sides
- Centered on the sides of the hatch compartments, above the side compartments:
  T.F. GREEN AIRPORT
  FIRE – RESCUE
- A “4”, at least 24.00” tall, at the bottom of the roll-up doors for the Driver’s 1 and Passenger’s 1 compartments.
- Centered on the rear rollup door, with the top line arched:
  T.F. GREEN
  4
  AIRPORT
- The lettering on the sides of the hatch compartment, the “4” on the Driver 1 and Passenger 1 compartments, and on the rear compartment door shall be a blue Scotchlite material.
- Scotchlite lettering shall match the font and general appearance of existing T.F. Green Fire-Rescue apparatus lettering. Digital photos and measurements shall be provided to the successful bidder for matching purposes.
- The cab lettering shall be gold leaf, totally encapsulated between two (2) layers of clear vinyl.
- A “4”, blue to match the Scotchlite, and as large as practicable, shall be painted on the grille at the cab face.
- A “4”, blue Scotchlite, 24.00” tall, centered on the cab roof with the bottom of the numeral towards the front of the truck
- Blue Scotchlite chevrons, 6.00” wide, shall be placed on the front of the front bumper extension, alternating at 6.00” with the safety lime yellow paint of the bumper.

Specific details of all lettering will be decided at the Preconstruction Conference.

421. UNDERCOATING, CAB & BODY

The apparatus shall be properly treated by an authorized Ziebart dealer.

The underside of the apparatus shall be undercoated with an asphalt petroleum based material, dark in color.

The undercoating material utilized on the apparatus shall be formulated to resist corrosion and deaden unwanted sound or road noise.

Coating texture shall be firm, flexible, and resistant to abrasion. Minimum dry film thickness shall be in the range of 8.00 to 12.00 mils.

The material shall be applied to the following areas:

- Body and cab wheel well fender liners, on the back side only.
- Underside of body and cab sheet metal and structural components.
- Underside and vertical sides of all sheet metal compartmentation, including support angles.

- Structural support members under running boards, rear platforms, battery boxes, walkways, etc.
- Inside surfaces of the pump heat enclosure (where installed).

APPENDIX A

Anticipated Equipment Storage Locations

This equipment is not to be considered part of the specification, it is only provided to ensure the compartmentation on the vehicle is capable of carrying the required equipment, and to plan equipment mounts.

Compartments are numbered with "1" at the rear of the vehicle and increasing moving forward.

Crosslay Compartment

- 1-3/4" preconnected handline, 200' long with TFT Mid-Force nozzle
- 1-3/4" preconnected handline, 300' long, with TFT Mid-Force nozzle
- 2-1/2" preconnected handline, 200' long, with TFT Dual-Force nozzle
- Long spine board

Driver's Side 4

- 1 x 2-1/2" spanner wrench set
- 1 x LDH spanner wrench set

Driver's Side 3

- 3 x TFT multi-expansion foam tubes: two (2) model FJ-MX-HM, one (1) model FJ-HMX
- 2 x 2-1/2" double male adapters*
- 2 x 2-1/2" double female adapters*
- 2 x 1-1/2" double male adapters*
- 2 x 1-1/2" double female adapters*
- 1 x 1-1/2" National Standard to Iron Pipe adapter*
- 1 x 1-1/2" Iron Pipe to National Standard adapter*
- 1 x 5" Storz to 2 x 2-1/2" gated wye
- 2 x 6.00" Storz to 5.00" Storz adapters*
- 2 x 5.00" Storz to 4.00" Storz adapters*
- 2 x 2-1/2" to 2 x 1-1/2" gated wyes
- TFT "Transformer" Piercing tip "plus" kit, model PA2
- Folding wheel chocks
- * All adapters in this compartment to be mounted to the slide-out peg board

Driver's Side 2

- 30" PRO BAR Halligan and 8 lb flat head axe, married
- 8 lb Pick head axe

- 8 lb Crash axe
- 32” closet hook
- 24” bolt cutter
- Sledge hammer
- Shovel
- 36” pry bar
- * All items in this compartment to be mounted in brackets to the swing-out peg board or to the Pac-Trac mounting system.

Driver’s Side 1

- 2 x LED 110v flood lights
- Tool box (309 piece Craftsman)
- 2-1/2 gallon water extinguisher*
- 2 x Amerex 591, 30 lb BC Dry Chemical extinguishers*
- 30 lb Class D extinguisher*
- 5.00” Storz to 3 x 2-1/2” gated wye with pressure relief valve
- 3 x 150’ rope bags
- * Extinguishers to be mounted with straps on upper shelf

Ladder Tunnel

- 24’ Duo Safety extension ladder
- 10’-15’ Duo Safety combination step/extension ladder
- 10’ Duo Safety folding attic ladder
- 6’ Pike Pole
- 8’ Pike Pole
- 12’ Pike Pole

Rear Compartment

- TFT Hydrant Gate, model AN5R1T01
- 2 x 2.5” gate valves
- Hydrant tool bag
- Tempest DD-21 gasoline powered, direct drive vent fan (in lock-down style bracket mounted to slide-out shelf)

Rear Bulkhead

- TFT Blitzfire OSC, model XX211A-HE with MD17A nozzle, mounted in a TFT model XX-B bracket

Passenger Side 1

- Paratech Interstate/Motorway Vehicle Stability Kit strut set
    - 2 x LongShore Strut 304 36-50 in
    - 2 x LongShore Strut 406 48-73 in
    - 2 x LongShore Strut 610 72-116 in (alternate locations for these struts may be acceptable)
    - 3 x LongShore 235 Extension 24 in
    - 3 x LongShore 435 Extension 48 in
    - 4 x V Base
    - 4 x Contour Base
    - 4 x Multi-Base
    - 6 x Hinged Base Plate w/ Anchor Ring 12 in
    - 2 x Chain 20 ft x 3/8 in, grade 80
    - 6 x Ratchet Belt w/Finger Hook 27 ft
    - 4 x Tie Down Keys w/J Hook
    - Non Slip Neoprene Pad
- Vetter/Paratech Model 117 lifting air bag set with basic control kit
    - 1 x KPI-12, 15” X 15”
    - 2 x KPI-17, 15” X 21”
    - 2 x KPI-22, 20” X 20”
    - 2 x KPI-32, 24” X 24”
    - 1 x KPI-35L, 15” X 42”
    - Master Control Kit inside a Pelican 1600 case, 19.3" H x 24.6" W x 12" D
- 4 x 12’ chain
- Vetter/Paratech 26 ton lifting bag set control kit (minus air bags)
- Hurst Support System Sets (4 each 1”, 2”, 3”, pads, 3” and 6” wedges)
- DeWalt 20 volt Lithium Ion cordless combo kit, with hammer drill and reciprocating saw, inside a Pelican 1610 case, 25.0”L x 20.0” H x 12.0”W

Passenger Side 2

- Husqvarna 545 chain saw, in mounting bracket
- Husqvarna K1200 rotary saw, in mounting bracket

Passenger Side 3

- 2 x 1.5 gallon gasoline cans, in mounting brackets
- 4 x 12’ x 18’ salvage covers, folded
- 2 x Plastic totes with absorbent pads, 26” L x 14” H x 16” W
- Drain cover storage tube, removable, 9” diameter x 54” long
- 2 x Andax 100 gallon Tank traps, 24” diameter x 12” high

Passenger Side 4

- Hurst e-Draulic spreader, model SP 310 E2, in mounting bracket
- Hurst e-Draulic cutter, model S700 E2, in mounting bracket
- Hurst e-Draulic ram, model E421E2, in mounting bracket
- Hurst mini-lite spreader
- Hurst mini-lite 8 inch ram
- Hurst mini-lite hand pump
- Hurst mini-lite pedal cutter
- 3 x Hurst e-Draulic 110 volt AC adapters
- 2-1/2” Spanner wrench set
- LDH spanner wrench set
- Assorted wooden cribbing (6"x6", 4"x4", 2"x4", etc, all ~ 24" long)
- 2x Hurst e-Draulic battery chargers, 120 volt, AC

Crew Cab

- MSA 5000 Handheld Thermal Imaging Camera charger, 12 volt DC

Slide-Out Trays Under Vehicle Body

- 2 x Vetter/Paratech 48-ton air cushions, 4” H x 52” diameter

APPENDIX B

Bid Compliance Worksheet

If the bidders' proposal fully meets the requirements of the section/paragraph, mark "Yes." If the bidder cannot meet the requirement of the section/paragraph and an exception is being taken, mark "No" and fully explain the exception on the separate "exceptions" document provided in the Response Form (Item 3).

Firm Name: _____

Contact Name: _____

Manufacturer Representing: _____

FAILURE TO INCLUDE THIS WORKSHEET AS A COMPONENT OF THE BID PACKAGE WILL RESULT IN A BID DEEMED NON-RESPONSIVE.

General Requirements

SECTION	YES	NO
1. Intent of specifications		
2. Instructions to bidders		
3. Exceptions		
4. General Design and Construction		
5. Approval Drawings		
6. Preliminary Pump Operator's Panel Layout Drawing		
7. Quality and Workmanship		
8. Delivery		
9. Manuals and Service Information		
10. Performance Tests and Requirements		
11. Failure to Meet Test		
12. Dealership Service and Warranty Support		
13. Manufacturer Service and Warranty Support		
14. Single Source Manufacturer		
15. NPFA 1901, 2016 Edition Standards		
16. NFPA Compliance		
17. Vehicle Inspection Program Certification		
18. Pump Test		
19. Generator Test		
20. Preconstruction and Final Inspection Trips		
21. Contract		
22. New and Unused		
23. Construction Review and Weekly Progress Reports		

Warranties

SECTION	YES	NO
24. One Year Vehicle Material and Workmanship		
25. Three Year Chassis Material and Workmanship		
26. Fifty Year Structural Integrity		
27. Three Year Front Axle Material and Workmanship		
28. Three Year Steering Gear		
29. Two Year Rear Axle		
30. Three Year Anti-Lock Braking System Material/Workmanship		
31. Five Year Engine		
32. Five Year Transmission		
33. Five Year Transmission Cooler		
34. Ten Year Cab Structural Integrity		
35. Five Year Electronic Modules and Displays		
36. Ten Year Body Structural Integrity		
37. Four Year Camera System		
38. Ten Year Compartment Lights		
39. Lifetime Water Tank		
40. Ten Year Roll Up Doors		
41. Six Year Pump Material and Workmanship		
42. Ten Year Pump Plumbing		
43. Two Year Generator		
44. Ten Year Cab Paint and Corrosion		
45. Twelve Year Body Paint and Corrosion		
46. Three Year Striping and Lettering		
47. One Year Exhaust After Treatment System		

Certifications

SECTION	YES	NO
48. Vehicle Stability Certification		
49. Engine Installation Certification		
50. Power Steering Certification		
51. *Cab Integrity Certification		
52. Windshield Wiper Certification		
53. Seat Belt Anchor Strength Certification		
54. Seat Mounting Strength Certification		
55. Cab Defroster Certification		
56. Cab Heater Certification		
57. Cab Air Conditioning Performance Certification		
58. Amp Draw Report		

Manuals and Diagrams

SECTION	YES	NO
59. Fire Apparatus Parts CD Manual		
60. Chassis Service CD Manuals		
61. Chassis Operation CD Manuals		
62. Electrical Wiring Diagrams		
63. Pump Manuals		

Training

SECTION	YES	NO
64. Training		
65. Safety Video		

Vehicle Structure and Drive Train

SECTION	YES	NO
66. Chassis		
67. Dimensions		
68. GVW Rating		
69. Removable Components		
70. Frame		
71. Frame Reinforcement		
72. Galvanized Chassis Frame Assembly		
73. Front Non-Drive Axle		
74. Front Suspension		
75. Front Shock Absorbers		
76. Front Oil Seals		
77. Front Tires		
78. Rear Axle		
79. Top Speed of Vehicle		
80. Rear Suspension		
81. Rear Oil Seals		
82. Rear Tires		
83. Tire Balance		
84. Tire Pressure Management		
85. Chrome Lug Nut Covers		
86. Mud Flaps – Front		
87. Mud Flaps – Rear		
88. Wheel Chocks		
89. Wheel Chock Brackets		
90. Electronic Stability Control		
91. Anti-Lock Brake System		
92. Automatic Traction Control		
93. Brakes		
94. Air Compressor – Brake System		

SECTION	YES	NO
95. Brake System		
96. Brake System Air Dryer		
97. Brake Lines		
98. Air Inlet		
99. Additional Parking Brake Control		
100. U-Bolt Guards Over Parking Brake Knob		
101. Engine		
102. Repto Drive		
103. High Idle		
104. Engine Brake		
105. Clutch Fan		
106. Engine Air Intake		
107. Exhaust System		
108. Radiator		
109. Coolant Lines		
110. Fuel Tank		
111. Diesel Exhaust Fluid Tank		
112. Fuel Shutoff		
113. Fuel Cooler		
114. Transmission		
115. Transmission Shifter		
116. Transmission Programming		
117. Transmission Cooler		
118. Driveline		
119. Steering		
120. Steering Wheel		
121. Automatic Chassis Lubrication		
122. Bumper		
123. Gravel Pan		
124. Hose Tray		
125. Hose Restraint Straps		
126. Lift and Tow Mounts		
127. Tow Hooks		
128. Line-X Coating – Front Bumper		

Vehicle Cab

SECTION	YES	NO
129. Cab, General		
130. Cab Pump Enclosure		
131. Interior Cab Insulation		
132. Fender Liners		
133. Panoramic Windshield		
134. Windshield Wipers		
135. Fast-Service Access Front Tilt Hood		
136. Engine Tunnel		
137. Cab Rear Wall Exterior Covering		

SECTION		YES	NO
138.	Cab Lift		
139.	Cab Lift Interlock		
140.	Grille		
141.	Door Jamb Scuff plates		
142.	Front Cab Trim		
143.	Cab Side Molding		
144.	Mirrors		
145.	Convex Mirrors		
146.	Doors		
147.	Door Panels		
148.	Recessed Pockets		
149.	Electric Window Controls		
150.	Stirrup-Style Cab Steps		
151.	Step Lights		
152.	Fender Crowns		
153.	Crew Cab Windows		
154.	Window Interior Trim		
155.	Cab Interior		
156.	Cab Interior Upholstery		
157.	Cab Interior Paint		
158.	Cab Floor		
159.	Cab Defroster		
160.	Crew Cab Heater		
161.	Air Conditioning		
162.	Interior Cab Insulation		
163.	Sun Visors		
164.	Grab Handles		
165.	Engine Compartment Light		
166.	Access to Engine Dipsticks		
167.	Map Box		
168.	Cab Safety System		
169.	Frontal Impact Protection		
170.	Side Roll Protection		
171.	Seating Capacity		
172.	Officer’s Seat		
173.	Driver’s Seat		
174.	Rear Facing Passenger Side Outboard Seat		
175.	Forward Facing Center Seats		
176.	Seat Upholstery		
177.	SCBA Holders		
178.	Seat Belts		
179.	Shoulder Harness Height Adjustment		
180.	Seat Belt Monitoring System		
181.	Seat Belt Audible Alarm		
182.	Radio Compartment		
183.	Helmet Holders		
184.	Cab Dome Lights		
185.	Overhead Map Lights		

SECTION		YES	NO
186.	Gooseneck Style Light		
187.	EMS Compartment		
188.	EMS Compartment Light		
189.	EMS Compartment Shelving		
190.	Meter Compartment		
191.	Cab Instrumentation		
192.	Gauges		
193.	Indicator Lamps		
194.	Alarms		
195.	Indicator Lamp and Alarm Prove-Out		
196.	Control Switches		
197.	Custom Switch Panels		
198.	Diagnostic Panel		
199.	Cab LCD Display		
200.	Air Restriction Indicator		
201.	Pump Pressure Gauge in Cab		
202.	"Do Not Move Apparatus" Indicator		
203.	Do Not Move Truck Messages		
204.	Switch Panels		
205.	Wiper Control		
206.	Information Center		
207.	Information Center Operation		
208.	Information Center General Screen Design		
209.	Information Center Page Screens		
210.	Information Center Menu Screens		
211.	Vehicle Data Recorder		
212.	Rear Vision Camera System		
213.	Rear Vision Camera Guard		
214.	Thermal Imaging Camera, Color Digital Video Camera, and DVR System		

Electrical Power System

SECTION		YES	NO
215.	Solid State Control System		
216.	Circuit Protection and Control Diagram		
217.	On-Board Electrical System Diagnostics		
218.	Advanced Diagnostics		
219.	Indicator Light and Prove-Out System		
220.	Voltage Monitor System		
221.	Enhanced Software		
222.	Dedicated Radio Equipment Connection Points		
223.	Radios		
224.	EMI/RFI Protection		
225.	Battery System		
226.	Battery System – Starter		
227.	Master Battery Switch		

SECTION		YES	NO
228.	Battery Compartments		
229.	Jumper Studs		
230.	Additional Jumper Studs		
231.	Battery Charger / Air Compressor		
232.	Auto-Eject for Electrical Shore Line		
233.	Alternator		
234.	Electronic Load Manager		
235.	Sequencer		
236.	Headlights		
237.	Directional Lights		
238.	Cab Clearance/Marker/ID Lights		
239.	Back Up Alarm		

Vehicle Body

SECTION		YES	NO
240.	Water Tank		
241.	Direct Tank Fill		
242.	Body Dimensions		
243.	Hose Bed		
244.	Hose Bed Dividers		
245.	Hose Bed Restraint		
246.	Running Boards		
247.	Tail Board		
248.	Rear Wall, Body Material		
249.	Tow Bar		
250.	Body		
251.	Underbody Support System		
252.	Aggressive Walking Surface		
253.	Louvers		
254.	Testing of Body Design		
255.	Compartments, Driver's Side		
256.	Compartments, Passenger's Side		
257.	Underbody Storage Compartments		
258.	Rollup Doors, Side Compartments		
259.	Hatch Compartments		
260.	Compartments, Rear		
261.	Roll Up Door, Rear Compartment		
262.	Pull Straps		
263.	Compartment Lighting		
264.	Hatch Compartment Lighting		
265.	Compartment Shelving Mounting Tracks		
266.	Fixed and Adjustable Shelves		
267.	Slide-Out Floor Mounted Tray		
268.	Swing-Out Tool Mounting Board		
269.	Drop-Down, Sliding Tool Tray		
270.	Slide-Out Tool Board		

SECTION		YES	NO
271.	Air Bag and Rescue Strut Storage System		
272.	Oil Dry Hopper		
273.	Air Hose and Reel		
274.	Matting, Compartment Shelving		
275.	Matting, Compartment Floor		
276.	Compartment Interior Mounting Surfaces		
277.	Rub Rail		
278.	Body Fender Crowns and Liners		
279.	Hard Suction Hose		
280.	Hose Troughs		
281.	Air Cylinder Storage		
282.	Extension Ladder		
283.	Combination Step and Extension Ladder		
284.	Ladder Storage		
285.	Folding Ladder		
286.	Pike Poles		
287.	Pike Pole Storage		
288.	Top Access Ladder		

Water System

SECTION		YES	NO
289.	Pump, General		
290.	Pump Mounting		
291.	Mechanical Seals		
292.	Pump Gear Case		
293.	Clutch		
294.	* Pumping Modes		
295.	Pump Shift		
296.	Transmission Lockup		
297.	Auxiliary Cooling System		
298.	Intake Relief Valve		
299.	Pressure Controller		
300.	Priming Pump		
301.	Plumbing		
302.	Main Pump Inlets		
303.	Main Pump Inlet Caps		
304.	Valves		
305.	Left Side Auxiliary Inlet		
306.	Auxiliary Inlet Control		
307.	Pump Inlet Anode		
308.	Right Side Main Inlet Control		
309.	Inlet Bleeder Valve		
310.	Tank to Pump		
311.	Tank Refill		
312.	Left Side Discharge Outlets		
313.	Right Side Discharge Outlet		

SECTION		YES	NO
314.	Large Diameter Discharge Outlet		
315.	* Front Bumper Turret Plumbing		
316.	* Bumper Turret		
317.	Bumper Handline Air Blowdown Valve		
318.	Rear Discharge Outlets		
319.	Discharge Caps		
320.	Rear Outlet Elbows		
321.	Outlet Bleeder Valves		
322.	Large Diameter Discharge Adapter		
323.	Discharge Outlet Controls		
324.	Deluge Riser		
325.	Monitor		
326.	Monitor Nozzles		
327.	Crosslay Hose Beds		
328.	Long Backboard Storage Trough		
329.	Rollup Door, Crosslay Ends		
330.	Pump Control Panel		
331.	Pump Panel Configuration		
332.	Pump and Gauge Panel		
333.	Pump and Plumbing Access		
334.	Pump Freeze Protection		
335.	Pump Compartment Light		
336.	Vacuum and Pressure Gauges		
337.	Pressure Gauges		
338.	Pump Panel Water Level Gauge		
339.	Large Format Water Level Gauge		
340.	Cab Water Level Gauge		
341.	Side Control Pump Operators/Pump Panel Lighting		

Foam System

SECTION		YES	NO
342.	Foam System, General		
343.	* System Capacity		
344.	Balanced Pressure Control System		
345.	Hydraulic Drive System		
346.	Foam Concentrate Pump		
347.	External Foam Concentrate Connections		
348.	Strainer		
349.	Flush System		
350.	Foam Tank Fill		
351.	Foam Concentrate Metering Valves		
352.	Ratio Flow Proportioner		
353.	* Foam Metering and Ratio Control		
354.	Foam Tank		
355.	Foam Tank Drain and Bottom Fill		
356.	Foam Level Gauges		

12 Volt Direct Current Wiring and Lighting

SECTION		YES	NO
357.	Electrical Harness Installation		
358.	Battery Cable Installation		
359.	Electrical Component Installation		
360.	Rear Clearance/Marker/ID Lighting		
361.	Rear FMVSS Lighting		
362.	License Plate Brackets		
363.	Intermediate Light		
364.	Cab Perimeter Scene Lights		
365.	Body Perimeter Scene Lights		
366.	Step Lights		
367.	12 Volt Front Scene Lighting		
368.	12 Volt Side Scene Lighting		
369.	Side Work Lights		
370.	Hose Bed Lighting		
371.	Rear Work Lights		
372.	Mounted Flash Lights		
373.	Air Horn System		
374.	Air Horn Control		
375.	Electronic Siren		
376.	Speaker		
377.	Auxiliary Mechanical Siren		
378.	Mechanical Siren Control		
379.	Cab Roof Light Bar		
380.	Additional Cab Roof Light Bars		
381.	Cab Face Warning Lights		
382.	Side Zone Lower Lighting		
383.	Rear Zone Lower Lighting		
384.	Rear Zone Upper Lighting		
385.	12 Volt Cab Interior Receptacles		
386.	USB Cab Receptacle		

Alternating Current Electrical System

SECTION		YES	NO
387.	General		
388.	Grounding		
389.	Operation		
390.	Overcurrent Protection		
391.	Wiring Methods		
392.	Wiring Identification		
393.	Wet Locations		
394.	Dry Locations		
395.	Listing		
396.	Electrical System Testing		
397.	Operational Testing per NPFA 1901		

SECTION		YES	NO
398.	Generator		
399.	Generator Instruments and Controls		
400.	Generator Wiring		
401.	Wiring		
402.	Load Center		
403.	Circuit Breakers		
404.	Generator Location		
405.	Generator Start		
406.	Electric Cord Reels		
407.	Cord		
408.	120 Volt Receptacles		
409.	120 Volt Shoreline Receptacles		

Loose Equipment

SECTION		YES	NO
410.	Supplied Loose Equipment		
411.	Equipment Mounting and NFPA 1901 Required Loose Equipment		

Painting and Lettering

SECTION		YES	NO
412.	Paint, General		
413.	Paint, Front Wheels		
414.	Paint, Rear Wheels		
415.	Compartment Interior Finish		
416.	Reflective Bands		
417.	Chevron Striping, Rear		
418.	Reflective Stripe, Cab Doors		
419.	Reflective Stripes, Slide-Out Trays and Tool Boards		
420.	Lettering		
421.	Undercoating, Cab and Body		

APPENDIX C

7/800 MHz Specification in Accordance with

Rhode Island Emergency Management Agency – RISCON

APX7000 MP DUAL BAND MODEL OPTIONS:

QA00569AA	ADD: 7/800 MHz PRIMARY BAND
QA00308A	ADD: VHF SECONDARY BAND
QA00579AA	ADD: ENABLE DUAL BAND OPERATIONS
Q806BK	ADD: ASTRO DIGITAL CAI OPERATION
Q361AN	ADD: P25 9600 BAUD TRUNKING
QA00577AA	ADD: FRONT DISPLAY AND FULL KEY
H869BW	ENH: MULTI KEY
Q629AH	AES ENCRYPTION

TOTAL OPTIONS

H38BS	ADD: SMARTZONE OPERATION
GA00232AC	ENH 3 YR SFS LITE
QA01749AB	ADD: SW KEY SUPPLEMENTAL DATA
Q507AD	INT: 12.5 KHZ FCC MANDATE
H415EU	INT: BULK PACKAGING.
W969BG	ADD: AES ENCRYPTION 0.ERAT
QA00894AA	INT: GCAI DUSTCOVER
Q173AX	INT: SMARTZONE OMNILINK (NON-P)

APX6500 7/800 MHz

G8068	ADD: ASTRO DIGITAL CAI OPERATION
G51AU	ADD: SMARTZONE OPERATION APX6500
QA01648A	ADD: ADVANCED SYSTEM KEY – HARDWARE KEY
G361AH	ADD: P25 TRUNKING SOFTWARE
G174AD	ADD: ANT 3DB LOW –PROFILE 762-870
G442AJ	ADD: 05 CONTROL HEAD
G444AE	ADD: APX CONTROL HEAD SOFTWARE

TOTAL OPTIONS: 13

G831AD	ADD: SPEAKER 15 WATT WATER RESISTANT
W22BA	ADD: PALM MICROPHONE
G843AH	ADD: MULTIPLE KEY ENCRYPTION OPERAT
G843AH	ADD: AES ENCRYPTION APX7500
G67CW	ADD: REMOTE MOUNT MIS POWER
G24AX	ENH: 2 YR SFS LITE