DEERFIELD-BANNOCKBURN FIRE PROTECTION DISTRICT

Request for Proposal

(RPF) No. 5604-1113

for

One Triple-Combination Pumper

Issued on

October 22, 2019

Proposals must be delivered to:
Deerfield-Bannockburn Fire Department
500 Waukegan Road, Deerfield, IL 60015
Attention: Deputy Chief Ray Larson

All proposals must be received by the Fire District before
12:00 P.M. CDST on November 12, 2019

Questions regarding the RFP should be directed to:

Ray Larson, Deputy Chief
224-554-8364 (direct); 847-945-4066 (office); 847-945-8951 (fax),
rlarson@dbfd.org
NOTICE OF REQUEST FOR PROPOSAL

The Deerfield-Bannockburn Fire Department issues this request for proposal for the purchase of one (1) triple-combination pumper. All proposals shall be for a new, unused vehicle that meets the needs and specifications of the Fire District. Specifications are available, in person, from the Fire District at its main office located at 500 Waukegan Road, Deerfield, IL 60015, for a period of twenty-two days beginning on October 22, 2019. They will also be available during that time period on the district’s website. Submitted proposals shall follow the format set forth by the Fire District and included all request documentation as contained in the REQUEST FOR BID FOR NEW PUMPER-SPECIFICATIONS. The Fire District reserves the right to reject any and all proposals should it deem necessary and to accept any proposal it considers in the best interest of the Fire District.

DUE DATE FOR RECEIPT OF PROPOSALS
All proposals must be received by the Fire District before 12:00 P.M. CDST on November 12th at its main office located at 500 Waukegan Road, Deerfield, IL 60015 addressed as follows:

New Pumper Proposal

Deerfield-Bannockburn Fire Department

500 Waukegan Road

Deerfield, IL 60015

Proposals may be hand delivered or sent via U.S. Mail or private carrier. Oral, FAX, or other forms of proposal will not be accepted. All proposals become the property of the Fire District and will not be returned.

NOTICE OF WITHDRAWAL
Any proposal may be withdrawn provided notice is delivered to the Fire District at the same location as the proposal was delivered and is on company letterhead of the vendor by an authorized representative prior to the due date and time stated above.

CONTACT PERSON AT FIRE DISTRICT
Proposers who have questions and wish to request clarification or otherwise need to contact the Fire District regarding this specification may contact:

Deputy Chief Ray Larson

Deerfield-Bannockburn Fire Department

500 Waukegan Road

Deerfield, IL 60015

Phone 847-945-4066, FAX 847-945-8951
NEGOTIATION
The Fire District reserves the right to negotiate terms and conditions of proposals received prior to acceptance or rejection of any proposal.

REVIEW OF PROPOSALS
Sometime after the due date for proposals the Fire District will open and review each proposal. This will be done as time permits by Fire District staff. There will not be any formal opening procedure or ceremony.

SELECTION OF PROPOSAL
After the due date for proposals and after the Fire District staff has had sufficient time to adequately review each proposal, conduct comparisons and, if necessary, negotiations with any proposers, the Fire Department staff will forward its recommendation to the Board of Trustees the Fire District who will then decide whether to accept or reject any proposal.

LEGAL RIGHT TO SPECIFY
The Deerfield-Bannockburn Fire Department (for the remainder of this section referred to as the "specifier" or “purchaser”) chooses to exercise its Legal Right to Specify as determined by the U.S. Supreme Court's affirmation of the decision handed down in the case of Whitten Corp. vs. Paddock, by the U.S. District Court of Massachusetts, the First Federal District Court, which in effect states:

1. That as trained professionals, specifiers make informed judgments on products that they feel best serve their needs. Also, those proprietary specifications (if chosen) DO NOT violate any antitrust laws. Technically, very few brands of material or equipment are exactly alike, and if the specifier wants to limit the specification to one source, he has the right to do so and enforce it.
2. Only the specifier has the responsibility and judgment for determining whether a proposed substitution is an "or equal".
3. That from start to finish in the purchasing process, only the specifier can ultimately decide if another desirable product is available in lieu of the specification.
4. Finally, that the courts concluded "the burden is on the supplier or manufacturer, who has NOT been specified, to convince the specifier that their product is equal for the purpose of a particular project".

The specifier has determined that this product specification shall represent the product to which all offerings shall be compared. Since firefighting is an ULTRAHAZARDOUS,
UNAVOIDABLY DANGEROUS activity, only trained Fire Department personnel with specific knowledge in the area of Personal Protective Equipment shall be allowed to make the final determining decision on the selection of the appropriate product to serve the Fire Department's needs.

SPECIFICATIONS FOR A MULTI PURPOSE RESPONSE VEHICLE
Sealed proposals will be received by Deerfield-Bannockburn Fire Department for the furnishing of all necessary labor, equipment and material for the Fire Apparatus and other equipment as outlined in the following specifications.

INTENT OF SPECIFICATIONS
It shall be the intent of these specifications to cover the furnishing and delivery of a complete fire apparatus. 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 contractor.

Images and illustrative material in this specification are as accurate as known at the time of publication but are subject to change without notice. Images and illustrative material is for reference only, and may include optional equipment and accessories and may not include all standard equipment.

INSTRUCTIONS TO BIDDERS
Bids shall only be considered from companies that have an established reputation in the field of fire apparatus construction and have been in business for a minimum of 10 years. Furthermore, in order to insure fair, ethical, and legal competition, neither the original equipment manufacturer (O.E.M.) nor parent company of the O.E.M. shall have ever been fined or convicted of price fixing, bid rigging, or collusion in any domestic or international fire apparatus market (No exception).

If a bidder represents more than one fire apparatus company or brands of apparatus, they must only bid the top of the line that meets specification.

Each bidder shall furnish satisfactory evidence of their ability to construct the apparatus specified.

Any apparatus manufacturer or their parent company that has had a performance bond called in the last 10 years shall not be eligible to bid. Any bids from these manufactures shall be immediately rejected.

Each bid shall be accompanied by a set of manufacturer's set of 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 item in the departments advertised specifications.

In accordance with the current edition of NFPA 1901 standards, the proposal shall specify whether the fire department or apparatus dealership shall provide required loose equipment.

The purchaser will utilize this advertised specification to compare all submitted bid proposals. To facilitate comparison, all bid proposal specifications shall be submitted in the same sequence as the advertised specification. Any bidder who fails to submit a set of bid proposal specifications, or who photocopies and submits these specifications as their own construction details will be considered nonresponsive. This shall render such proposal ineligible for award.

The purchaser's specification shall, in all cases, govern the construction of the apparatus, unless a properly documented exception or deviation was approved. Any bid indicating that the manufacturer's proposal shall supersede the purchaser's specification will be considered a complete substitute and immediately rejected.

THE PURCHASER HAS THE RIGHT TO REJECT ANY BIDS WHICH DOES NOT MEET THESE SPECIFICATIONS AND IS THE SOLE DECIDER TO DEEM WHICH BID IS IN THE BEST INTEREST OF THE PURCHASER.

EXCEPTIONS
Bidders shall indicate in the "yes/no" column 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, and they are listed and fully explained on a separate page.

All deviations, no matter how slight, shall be clearly explained on a separate sheet, in the bid sequence, citing the page and 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". The buyer reserves the right to require a bidder to provide proof in each case that a substituted item is equal to that specified. The buyer shall be the sole judge in determination of acceptable substitutes.
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 pumphouse module assembly, the chassis assembly, body and electrical system. Apparatus using any subcontracted cab, chassis, pump module, electrical system or body will not be acceptable.

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 the National Fire Protection Association.

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

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.

DELIVERY
Apparatus, to ensure 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. A qualified delivery representative shall deliver the apparatus and remain for an足够 length of time to instruct personnel in proper operation, care and maintenance of the equipment delivered.

MANUALS AND SERVICE INFORMATION
The manufacturer shall supply at time of delivery, complete operation and maintenance manuals covering the complete apparatus as delivered. A permanent plate shall be mounted in
the drivers compartment which specifies the quantity and type of fluid required including engine oil, engine coolant, transmission, pump transmission lubrication, pump primer and drive axle.

**MULTIMEDIA PRESENTATION**
Since hands on visual is much more effective than written documentation and can be replayed for new personnel and as a refresher for existing personnel, an apparatus multimedia presentation 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.

**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. The vehicle shall adhere to the following parameters:

A) The apparatus, when fully equipped and loaded, shall have not less than 25 percent nor 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) 121.

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).

**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 the purchaser or its use by the purchaser during the above-specified period with the permission of the bidder shall not constitute acceptance.
SERVICE AND WARRANTY SUPPORT (DEALERSHIP)

TO ENSURE 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 (100) miles of the fire department.

SERVICE AND WARRANTY SUPPORT (MANUFACTURER)

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

The manufacturer shall employ a staff of adequate size (a minimum of 30 personnel) 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 a minimum of four certified EVT technicians on staff, not only providing technical expertise in the repair of fire apparatus, but also demonstrating the commitment to service after the sale.

LIABILITY

The successful bidder shall defend any and all suits and assume all liability for the use of any patented process including any device or article forming a part of the apparatus or any appliance furnished under the contract. To ensure this will occur, the bidder shall carry the following minimum insurance.

INSURANCE PROVIDED BY BIDDER

COMMERCIAL GENERAL LIABILITY INSURANCE

The successful bidder shall, during the performance of the contract and for three (3) years following acceptance of the product, keep in force at least the following minimum limits of commercial general liability insurance:
Each Occurrence $1,000,000
Products/Completed Operations Aggregate $1,000,000
Personal and Advertising Injury $1,000,000
General Aggregate $2,000,000

Coverage shall be written on a Commercial General Liability form. The policy shall be written on an occurrence form and shall include Contractual Liability coverage for bodily injury and property damage subject to the terms and conditions of the policy. The policy shall include Owner as an additional insured when required by written contract.

**COMMERCIAL AUTOMOBILE LIABILITY INSURANCE**

The successful bidder shall, during the performance of the contract, keep in force at least the following minimum limits of commercial automobile liability insurance and coverage shall be written on a Commercial Automobile liability form:

Each Accident Combined Single Limit: $1,000,000

**UMBRELLA/EXCESS LIABILITY INSURANCE**

The successful bidder shall, during the performance of the contract and for three (3) years following acceptance of the product, keep in force at least the following minimum limits of umbrella liability insurance:

Aggregate: $3,000,000

Each Occurrence: $3,000,000

The umbrella policy shall be written on an occurrence basis and at a minimum provide excess to the bidder's General Liability and Automobile Liability policies.

The required limits can be provided by one (1) or more policies provided all other insurance requirements are met.

Coverage shall be provided by a carrier(s) rated A- or better by A.M. Best.

All policies shall provide a 30-day notice of cancellation to the named insured. The Certificate of Insurance shall provide the following cancellation clause: Should any of the above described policies be cancelled before the expiration date thereof, notice shall be delivered in accordance with the policy provisions.

Bidder agrees to furnish owner with a current Certificate of Insurance with the coverages listed above along with the bid. The certificate shall show the purchaser as certificate holder.

Coverage shall be provided by a carrier(s) rated A- or better by A.M. Best.
All policies shall provide a 30-day notice of cancellation to the named insured. The Certificate of Insurance shall provide the following cancellation clause: Should any of the above described policies be cancelled before the expiration date thereof, notice shall be delivered in accordance with the policy provisions.

Manufacturer agrees to furnish owner with a current Certificate of Insurance with the coverages listed above along with the bid. The certificate shall show the purchaser as the certificate holder.

**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, pumphouse (including the sheet metal enclosure, valve controls, piping and operators 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, pumphouse, 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.

**NFPA 2016 STANDARDS**

This unit shall comply with the NFPA standards effective January 1, 2016, except for fire department specifications that differ from NFPA specifications. These exceptions shall be set forth in the Statement of Exceptions.

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

All horizontal surfaces designated as a standing or walking surface that are greater than 48.00” above the ground must be defined by a 1.00” wide line along its outside perimeter. Perimeter markings and designated access paths to destination points shall be identified on the customer approval print and are shown as approximate. Actual location(s) shall be determined based on materials used and actual conditions at final build. Access paths may pass through hose storage areas and opening or removal of covers or restraints may be required. Access paths may require the operation of devices and equipment such as the aerial device or ladder rack.

A plate that is highly visible to the driver while seated shall be provided. This plate shall show the overall height, length, and gross vehicle weight rating.

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.

**NFPA COMPLIANCE**
Apparatus proposed by the bidder shall meet the applicable requirements of the National Fire Protection Association (NFPA) as stated in current edition at time of contract execution. Fire department’s specifications that differ from NFPA specifications shall be indicated in the proposal as "non-NFPA".

**VEHICLE INSPECTION PROGRAM CERTIFICATION**
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 (no exception).

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.

**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 forwarded to the Fire Department.

**GENERATOR TEST**
If the unit has a generator, the generator shall be tested, approved, and certified by Underwriters Laboratories at the manufacturer's expense. The test results shall be provided to the Fire Department at the time of delivery.

**NEGOTIATION**
The Fire District reserves the right to negotiate terms and conditions of proposals received prior to acceptance or rejection of any proposal.

**REVIEW OF PROPOSALS**
Sometime after the due date for proposals the Fire District will open and review each proposal. This will be done as time permits Fire District staff.

**SELECTION OF PROPOSAL**
After the due date for proposals and after the Fire District staff has had sufficient time to adequately review each proposal, conduct comparisons and, if necessary, negotiations with any proposers, the Fire District staff will forward its recommendation to the Board of Trustees of the Fire District who will then decide whether to accept or reject any proposal.
### INSPECTION TRIP(S)

The bidder shall provide five (5) factory inspection trip(s) for four customer representative(s). The inspection trip(s) shall be scheduled at times mutually agreed upon between the manufacturer’s representative and the customer. All costs such as travel, lodging and meals shall be the responsibility of the bidder.

### SERVICE CENTERS

The bidder shall list their address and location of the factory authorized service centers showing evidence of being able to render quick and reliable service.

### BID BOND

All bidders shall provide a bid bond as security for the bid in the form of a 10% bid bond to accompany their bid. This bid bond shall be issued by a Surety Company who is listed on the U.S. Treasury Departments list of acceptable sureties as published in Department Circular 570. The bid bond shall be issued by an authorized representative of the Surety Company and shall be accompanied by a certified power of attorney dated on or before the date of bid. The bid bond shall include language, which assures that the bidder/principal shall give a bond or bonds as may be specified in the bidding or contract documents, with good and sufficient surety for the faithful performance of the contract, including the Basic One (1) Year Limited Warranty, and for the prompt payment of labor and material furnished in the prosecution of the contract.

Proposals received from bidders who do not manufacture the chassis shall provide a warranty that shall be issued jointly and severally by, and signed by, both the bidder and the chassis manufacturer.

If the successful bidder does not manufacture the chassis, the bidder shall supply a warranty bond, in addition to their performance bond, along with their signed contract. This warranty bond shall guarantee all terms and conditions of the Basic One (1) Year Limited Warranty and names both the bidder and chassis manufacturer as co-principals. This warranty bond shall be issued for the contract amount and shall remain in force for a term which is consistent with the term of the Basic One (1) Year Limited Warranty.

Notwithstanding any document or assertion to the contrary, any surety bond related to the sale of a vehicle shall apply only to the Basic One (1) Year Limited Warranty for such vehicle. Any surety bond related to the sale of a vehicle shall not apply to any other warranties that are included within this bid (OEM or otherwise) or to the warranties (if any) of any third party of any part, component, attachment or accessory that is incorporated into or attached to the vehicle. In the event of any contradiction or inconsistency between this provision and any other document or assertion, this provision shall prevail.

### PERFORMANCE BOND, 1 YEAR

The successful bidder shall furnish a Performance and Payment bond (Bond) equal to 100 percent of the total contract amount within 30 days of the notice of award. Such Bond shall be
in a form acceptable to the Owner and issued by a surety company included within the Department of Treasury’s Listing of Approved Sureties (Department Circular 570) with a minimum A.M. Best Financial Strength Rating of A and Size Category of XV. In the event of a bond issued by a surety of a lesser Size Category, a minimum Financial Strength rating of A+ is required.

Bidder and Bidder’s surety agree that the Bond issued hereunder, whether expressly stated or not, also includes the surety’s guarantee of the vehicle manufacturer’s Basic One (1) Year Limited Warranty period included within this proposal. Owner agrees that the penal amount of this bond shall be simultaneously amended to 100% percent of the total contract amount upon satisfactory acceptance and delivery of the vehicle(s) included herein. Notwithstanding anything contained within this contract to the contrary, the surety’s liability for any warranties of any type shall not exceed one (1) year from the date of such satisfactory acceptance and delivery, or the actual Basic One (1) Year Limited Warranty period, whichever is shorter.

**APPROVAL DRAWING**
A 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.

A “revised” approval drawing of the apparatus shall be prepared and submitted by the manufacturer to the purchaser showing any changes made to the approval drawing.

**DRAWING, COMPARTMENT LAYOUT**
A basic drawing shall be provided for the interior body compartments. This drawing shall be provided for graphic representation only and shall include such things as shelves, trays, reels, dividers, air control panels, air bottle storage bins, poly boxes & etc.

**DRAWING, RIGHT PUMP PANEL, CONTROL ZONE**
A detailed drawing to scale of the right pump panel shall be provided for customer approval prior to construction. This drawing shall include all the gauges and controls located on the right pump panel.

**DRAWING, CAB TOP VIEW**
On the sales drawing a top view of the cab seating and EMS cabinets shall be provided. The top view shall be a reference only of the seating and EMS cabinets in the order.

**DRAWING, LEFT PUMP PANEL, CONTROL ZONE**
A detailed drawing to scale of the left pump panel shall be provided for customer approval prior to construction. This drawing shall include all the gauges and controls located on the left pump panel.
ELECTRICAL WIRING DIAGRAMS
Two (2) USB flash drives containing "As-Built" electrical wiring diagrams specifically prepared for the chassis and body shall be provided. The diagrams shall consist of information pertaining to the 12 VDC systems only. Two (2) USB’s flash drives shall be shipped with the loose equipment with each truck. One (1) USB flash drive shall be included with the job folder at apparatus builder's facility for future reference.

Each USB flash drive shall include the following capabilities:

- The capability of viewing each separate diagram.
- The capability of zooming in on any section of each separate diagram.
- The capability of printing each separate diagram.
- The capability of printing each zoomed in area of each separate diagram.

Each USB flash drive shall include the following items:

- Title page, identifying the job number and chassis model.
- Table of contents.
- Truck specific electrical compartment and instrument layouts for the chassis.
- Truck specific electrical compartment layouts for the body.
- Applicable drawings from the appropriate standard wiring diagrams.
- All truck specific wiring diagrams (special drawings).
- Harness drawings for all wiring harnesses used on the chassis.
- Harness drawings for all wiring harnesses used on the body.
- All truck input and output programming sheets (multiplexed trucks only).

CHASSIS
Chassis provided shall be a new, tilt-type, cab-forward, custom fire apparatus. The chassis and cab shall be manufactured in the apparatus body builder's facility eliminating any split warranty responsibility. To ensure years of reliable service, capacity for the intended load to be sustained, and the type of service required, the chassis shall be designed and manufactured for heavy-duty service, utilizing heavy duty 13.00" frame rails, crossmembers, and cab construction as described elsewhere in this specification.

WHEELBASE
The wheelbase of the vehicle shall be no greater than 208".

GVW RATING
The gross vehicle weight rating shall be a minimum of 56,300 pounds.

FRAME
The chassis frame shall be built with two (2) steel channels bolted to five (5) cross members or more, 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 3,119,040 in-lb. over the critical regions of the frame assembly, with a section modulus of 18.96 cubic inches with a rbm of 2,275,200 in-lb. over the rear axle.

The frame rails shall be constructed of 120,000 psi yield strength heat-treated 0.38" thick steel with 3.50" wide flanges.

**FRAME REINFORCEMENT**

In addition, a full-length mainframe internal "C" liner shall be provided. The liner shall be an internal "C" design that steps to a smaller internal "C" design over the rear axle. It shall be heat-treated steel measuring 12.50" x 3.00" x 0.25" through the front "C" portion of the liner, stepping to 9.38" x 3.00" x 0.25" through the rear "C" portion of the liner. Each liner shall have a section modulus of 13.58 cubic inches, yield strength of 110,000 psi, and rbm of 857,462 in-lb. Total rbm at wheelbase center shall be 4,391,869 in-lb.

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

**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 elastomer 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 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 0 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 discharge, front suction, or aluminum wheels shall not infringe on this cramp angle.

**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.

The independent suspension shall be put through a durability test that has simulated extended driving of an inner city.

**FRONT SHOCK ABSORBERS**
KONI heavy-duty telescoping shock absorbers shall be provided on the front suspension.

**FRONT OIL SEALS**
Oil seals with viewing window shall be provided on the front axle.

**FRONT TIRES**
Front tires shall be Goodyear 425/65R22.50 radials, 20 ply G296 tread, rated for 22,800 lb. maximum axle load and 75 mph maximum speed.

The tires shall be mounted on Alcoa 22.50” x 12.25” polished aluminum disc type wheels with a ten (10) stud, 11.25” bolt circle.

**REAR AXLE**
The rear axle shall be a Meritor™, Model RS-30-185, with a capacity of 33,500 lb.

**TOP SPEED OF VEHICLE**
NFPA 1901, 2016 edition requires limits on the top speed of vehicles. NFPA 4.15.2 requires that the maximum top speed of fire apparatus with a GVWR over 26,000 lb. shall not exceed either 68 mph or the manufacturer’s maximum fire service speed rating for the tires installed on the apparatus, whichever is lower. NFPA 4.15.3 requires that if the combined water tank and foam agent tank on the fire apparatus exceed 1250 gallons or the GVWR of the vehicle is over 50,000 lb., the maximum top speed of the apparatus shall not exceed either 60 mph or the
manufacturer’s maximum fire service speed rating for the tires installed on the apparatus, whichever is lower. It is the intention of the standard to improve safety by limiting the speed of all apparatus to 68 mph, and tankers or heavy apparatus to 60 mph. By requesting an exception to this requirement, the purchasing authority is consciously choosing to operate their apparatus at speeds above the limits designated as safe speeds by the NFPA Technical Committee on Fire Department Apparatus.

The top speed of the apparatus as manufactured exceeds the NFPA requirements. Per fire department specification of a top speed that exceeds NFPA requirements, the apparatus shall be non-compliant to NFPA 1901 standards at time of contract execution.

A rear axle ratio shall be furnished to allow the vehicle to reach an approximate top speed of 65 MPH.

**REAR SUSPENSION**

Rear suspension shall be a Hendrickson FMX 312 EX, air ride with a ground rating of 33,500 lb. The suspension shall have the following features:

- Heavy-duty shock absorbers to protect air springs from overextension
- Heavy-duty torque rods and bushings
- Premium, heavy-duty rubber bushings require no lubrication
- Integrated stabilizer design results in greater stability
- Low spring rate air springs for excellent ride quality
- Dual height control valves to maintain level vehicle from side to side

**REAR OIL SEALS**

Oil seals shall be provided on the rear axle(s).

**REAR AIR RIDE SUSPENSION DUMP VALVES**

The rear air ride suspension shall be supplied with a dump valve system provided by the custom chassis manufacturer.

The control shall be recessed into the vertical wall on the left side of the rear entrance near the location of the door grabber.

To prevent accidental activation of the valves, a 5 second timed delay shall be built into the control circuit. The chassis back-up alarm shall sound when the control is active.

The parking brake must be applied before the control shall be active. Release of the parking brake shall automatically inflate the suspension.
REAR TIRES
Rear tires shall be four (4) Goodyear 315/80R22.50 radials with 20 ply G289 WHA tread, rated for 36,360 lb. maximum axle load and 68 mph maximum speed.

The tires shall be mounted on Alcoa® 22.50" x 9.00" polished aluminum disc wheels with a ten (10) stud 11.25" bolt circle.

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.

TIRE PRESSURE MANAGEMENT
There shall be a Real Wheels LED Air Secure™ tire alert pressure management system provided, that shall monitor each tire's pressure. A sensor shall be provided on the valve stem of each tire for a total of six (6) tires.

The sensor shall calibrate to the tire pressure when installed on the valve stem for pressures between 10 and 200 psi. The sensor shall activate an integral battery-operated LED when the pressure of that tire drops 5 to 8 psi.

Removing the cap from the sensor shall indicate the functionality of the sensor and battery. If the sensor and battery are in working condition, the LED shall immediately start to flash.

WHEEL SEPARATOR PLATES
Alcoa DiscMate wheel separator plates shall be provided and installed on all the aluminum wheels. The wheel separator plate is a thin material used to protect the wheel's mounting surface from cosmetic damage during use.

LUG NUT COVERS
Stainless steel lug nut covers shall be installed on all lug nuts.

MUD FLAPS
Mud flaps shall be installed behind the front and rear wheels of the apparatus.

WHEEL CHOCKS
There shall be one (1) pair of Checkers Industrial Products AT3512-AC-Y yellow urethane wheel chocks provided. The wheel chocks can be used on a tire diameter up to 46.00".

ANTI-LOCK BRAKE SYSTEM
The vehicle shall be equipped with a Meritor WABCO 4S4M, anti-lock braking system. The ABS shall provide a 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.

**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. Dust shields cannot be provided.

**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.

**BRAKE SYSTEM**
The brake system shall include:

- Bendix® dual brake treadle valve
- 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
- A parking "brake on" indicator light on instrument panel
- Park 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)
- 1/4 turn drain valve on each air tank

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 (no exception).

**BRAKE SYSTEM AIR DRYER**
The air dryer shall be WABCO System Saver 1200 with spin-on coalescing filter cartridge and 100-watt heater.
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.

AIR INLET WITH AUTOMATIC EJECT
One (1) air inlet with Kussmaul Air Eject shall be provided. The inlet shall be located behind the driver door above the front tire. It shall allow station air to be supplied to the apparatus brake system through a shoreline hose. The inlet shall automatically disconnect the air line when the truck is started. It shall be equipped with a male coupling and be recessed. 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.

AIR OUTLET
One (1) air outlet shall be installed with a female coupling and shut off valve, located on the driver side pump panel. This system shall tie into the "wet" tank of the brake system and include an 85-psi pressure protection valve in the outlet line to prevent the brake system from losing all air.

Female coupling and male fitting shall be .25" thread.

A mating male fitting shall be provided with the loose equipment.

COVER OVER AIR INLET
A Kussmaul, Model 091-28-AK, weatherproof red cover shall be provided over the recessed automatic airline disconnect.

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

<table>
<thead>
<tr>
<th>Make</th>
<th>Detroit™</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model:</td>
<td>DD13®</td>
</tr>
<tr>
<td>Power:</td>
<td>505 hp at 1625 rpm</td>
</tr>
<tr>
<td>Torque:</td>
<td>1750 lb.-ft at 1075 rpm</td>
</tr>
<tr>
<td>Governed Speed:</td>
<td>Full Load - 1900 rpm Road/2080 rpm Parked PTO</td>
</tr>
<tr>
<td>Emissions Certification:</td>
<td>EPA 2016 (GHG17)</td>
</tr>
<tr>
<td>Fuel:</td>
<td>Diesel</td>
</tr>
<tr>
<td>Cylinders:</td>
<td>Six (6)</td>
</tr>
<tr>
<td>Displacement:</td>
<td>781 cubic inches (12.8L)</td>
</tr>
<tr>
<td>Starter:</td>
<td>Delco Remy 39MT™</td>
</tr>
<tr>
<td>Fuel Filters:</td>
<td>Dual cartridge style with check valve, water separator, and water in fuel sensor</td>
</tr>
</tbody>
</table>
The engine shall include On-board diagnostics (OBD), which provides self-diagnostic and reporting. The system shall give the owner 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.

**REPTO DRIVE (IF BIDDER HAS A MODEL THAT HAS THIS OPTION)**

A rear engine power take off shall be provided to drive the water pump. A vibration dampener shall be provided between the REPTO and water pump. Transmission PTO's used to drive the water pump shall not be allowed due to their lower torque ratings. The rear engine power take off shall be the same as used extensively throughout the construction industry. Rear engine PTO's 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.

**LOCATION OF FILTERS**

For ease of serviceability, the following filters shall be mounted with ease of accessibility. The filters shall be accessible while standing on the ground with the cab tilted.

- Engine Oil Filter
- Fuel Pre-Filter
- Fuel Final Filter
- Coolant Filter
- Pump Transmission Oil Filter
- Foam System Hydraulic Filter (if equipped)

**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."

**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/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.

**HYDRAULIC FAN**

To reduce fan noise, provide on-demand cooling, and maximize cab space, the cooling shall be provided by a remote mounted hydraulic driven fan.

The fan speed shall be able to be controlled independent of the engine speed for higher cooling rates at low engine speeds when needed.

The hydraulic pump shall be driven from the engine's accessory drive to free up PTO's for other applications.

The hydraulic fan and cooling system shall be similar in design as those systems used in severe duty application such as construction, agriculture, forestry, mining, and rail industries.

**ENGINE AIR INTAKE**

To facilitate deeper fording capabilities while protecting the engine, the air intake with ember separator shall be mounted on the right side of the apparatus. It shall be located above the cab wheel well yet below the window line so as not to limit sight lines and cause blistering inside the cab. The ember separator is designed to prevent road dirt and recirculating hot air from entering the engine.

The ember separator shall be easily accessible without tilting the cab.

The air intake filter shall be located above the front axle directly above the frame rail so as not to require blistering of the cab interior and to provide easy access while standing on the ground for inspection and maintenance.

**EXHAUST SYSTEM**

The exhaust system shall include a diesel particulate filter (DPF) and a selective catalytic reduction (SCR) device to meet current EPA standards. The exhaust system shall be stainless steel from the turbo to the inlet of the SCR device and shall be 5.00” in diameter. 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 shall terminate horizontally ahead of the right-side rear wheels. A tailpipe diffuser shall be provided to reduce the temperature of the exhaust as it exits. Heat deflector shields shall be provided to isolate chassis and body components from the heat of the tailpipe diffuser.

**EXHAUST MODIFICATION**

The exhaust pipe shall be brought out from under the body at a 90-degree angle from the truck. The tail pipe shall terminate flush with the body rub rail, adaptable for the Plymovent system. The diameter of the diffuser shall be 7.00”. There shall be a clearance of 4.00” completely...
around the pipe once past the side of the body. A stop shall be provided on the tail pipe that shall prevent the nozzle from sliding too far on.

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

The radiator core shall have a minimum frontal area of 1755 square inches. Steel supply and return tanks shall be mounted to the core headers and steel side channels to complete the radiator assembly. The radiator shall be compatible with commercial antifreeze solutions.

The radiator shall include an integral de-aeration tank, with a remote mounted overflow tank. For visual coolant level inspection, the radiator shall have a built-in sight glass. 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.

**COOLANT LINES**
Gates® silicone hoses shall be used for all engine/heater coolant lines installed by the chassis manufacturer.

The chassis manufacturer shall also use Gates brand hose on other heater, defroster and auxiliary coolant circuits. There shall be some areas in which an appropriate Gates product is not available. In those instances, a comparable silicone hose from another manufacturer shall be used.

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.

**COOLANT DRAIN**
A drain valve shall be provided on the bottom of the engine water pump. Valve shall allow for coolant recovery.

**RADIATOR COOLANT VALVES**
Two (2) full flow valves shall be provided in the cooling system. The valves shall be installed in the main supply and return lines, allowing maintenance of the system without draining the radiator. Valves shall be approved for use with automotive anti-freeze.

Valves shall be for maintenance only.
FUEL TANK
A 65-gallon fuel tank shall be provided and mounted at the rear of the chassis. The tank shall be constructed of aluminum with the exterior unfinished. 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. (no exception).

A .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 that is marked "Ultra Low Sulfur - Diesel Fuel Only."

A .50" diameter vent shall be provided running from top of tank to just below 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.

DIESEL EXHAUST FLUID TANK
A 4.5-gallon diesel exhaust fluid (DEF) tank shall be provided and mounted in the driver's side body rearward 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 provided and marked "Diesel Exhaust Fluid Only". The fill inlet shall be located adjacent to the engine fuel inlet behind a common hinged, spring loaded, polished stainless-steel door on the driver side of the vehicle.

The tank shall meet the engine manufacturers 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 thaw the DEF in the event of freezing.

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

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

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

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

**TRANSMISSION SHIFTER**
A six (6)-speed push button shift module shall be mounted to right of driver on console. Shift position indicator shall be indirectly lit for after dark operation.

The transmission ratio shall be:

<table>
<thead>
<tr>
<th>Gear</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>3.51 to 1.00</td>
</tr>
<tr>
<td>2nd</td>
<td>1.91 to 1.00</td>
</tr>
<tr>
<td>3rd</td>
<td>1.43 to 1.00</td>
</tr>
<tr>
<td>4th</td>
<td>1.00 to 1.00</td>
</tr>
<tr>
<td>5th</td>
<td>0.75 to 1.00</td>
</tr>
<tr>
<td>6th</td>
<td>0.64 to 1.00</td>
</tr>
<tr>
<td>R</td>
<td>4.80 to 1.00</td>
</tr>
</tbody>
</table>

**TRANSMISSION PROGRAMMING**
The transmission shall be programmed to automatically shift the transmission to neutral when the parking brake is set to simplify operation and increase operational safety (no exception).

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

**TRANSMISSION FLUID**
The transmission shall be provided with TranSynd, or other Allison approved TES-295 heavy duty synthetic transmission fluid.

**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 where the driveline design requires it. The slip joint shall be coated with Glidecoat® or equivalent.

**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 VN20, hydraulic pump with integral pressure and flow control. All power steering lines shall have wire braded lines with crimped fittings.
A tilt and telescopic steering column shall be provided to improve fit for a broader range of driver configurations.

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

**LOGO AND CUSTOMER DESIGNATION ON HORN BUTTON**
The steering wheel shall have an emblem containing the fire apparatus manufacturer’s logo and customer name. The emblem shall have three (3) rows of text for the customer’s department name. There shall be a maximum of eight (8) characters in the first row, 11 characters in the second row and 11 characters in the third row.

The first row of text shall be: Deerfield

The second row of text shall be: Bannockburn

The third row of text shall be: Fire Dept.

**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 in the open area behind the crosslays in the pump compartment on the apparatus.

- Independent suspension control Arm Pivot Points
- Rear Axle Slack Adjusters
- Rear Axle Brake Cam Screws
- Rear Suspension Spring Pins
- Rear Suspension Shackle Pins

**BUMPER**
A one (1)-piece bumper manufactured from .25” formed steel with a .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 26.00” from the face of the cab. The bumper shall be 95.28” wide with 45-degree corners and side plates. The bumper shall be metal finished and painted job color. All dimensions are approximate.
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.

**GRAVEL PAN**
A gravel pan, constructed of bright aluminum treadplate, shall be furnished between the bumper and the cab face. The pan shall be properly supported from the underside to prevent flexing and vibration.

**TOOLBOX**
A tool compartment shall be provided on the left side of the bumper extension.

**RIGHT SIDE HOSE TRAY**
A hose tray shall be placed in the right side of the extended bumper.

The tray shall have a capacity of 125’ of 1.75” hose with nozzle

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

**LIFT AND TOW MOUNTS**
Mounted to the frame extension shall be lift and tow mounts. The lift and tow mounts shall be designed and positioned to adapt to certain tow truck lift systems.

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

**TOW HOOKS**
No tow hooks are to be provided. This truck shall be equipped with a lift and tow package with integral tow eyes.

**STRIP LIGHT UNDER BUMPER COVER**
There shall be one (1) Amdor Model AY-9220-072, 72.00" 12-volt DC LED strip light provided on the inside of the front bumper cover.

The light shall be activated when the battery switch is on and the bumper tray cover is opened.

**HOSE TRAY LIPS**
The gravel pan between the left side toolbox and the right-side hose tray(s) shall be provided with 4.00" to 5.00" raised lips above the deck plate.

The raised lips shall be constructed of aluminum treadplate.

The top edge of the raised lips shall have aluminum rod, welded around the perimeter.

A quantity of one (1) hose tray(s) shall be included.
FRONT BUMPER LINE-X COATING

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

EQUIPMENT TRAY

The front bumper extension shall have a stainless equipment tray recessed in the center. The tray shall be recessed enough to hold two (2) electric rescue tools.

EQUIPMENT TRAY COVER

A raised bright aluminum treadplate cover shall be provided full width over the equipment tray. Cover shall be raised approximately 8.00”.

The cover shall be attached with a stainless-steel hinge.

Two (2) rubber latches shall secure the cover in the closed position and a pneumatic stay arm on each side shall hold the cover in the open position.

CAB

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

The cab shall be constructed of aluminum by the apparatus manufacturer.

The cab shall be a cab-forward design that positions the driver and officer ahead of the engine tunnel, providing the greatest amount of room for the front occupants.

For reasons of structural integrity and enhanced occupant protection, the cab shall be of heavy-duty design.

The cab shall be 96.00” wide (outside door skin to outside door skin) to maintain maximum maneuverability.

The overall height (from the cab roof to the ground) shall be approximately 100.00”. The overall height listed shall be calculated based on a truck configuration with a 41.00” frame height. The cab skirt height shall be approximately 23.00” ahead of the front wheels and 21.00” behind the front wheels.

A 10-12” raised roof shall be provided. The raised portion shall start at the most forward point of the B-pillar and continue rearward to the back of the cab.

The crew cab shall be of the totally enclosed design with access doors constructed in the same manner as the driver and passenger doors.

The cab shall be a full tilt cab style. The engine shall be easily accessible and capable of being removed with the cab tilted.
The cabin shall have a three (3)-point cab mount system with rubber isolators.

**CAB ROOF Drip Rail**
For enhanced protection from inclement weather, a drip rail shall be furnished on the sides of the cabin. The drip rail shall be constructed of bright polished extruded aluminum and be bonded to the sides of the cabin. The drip rail shall extend the full length of the cabin roof.

**INTERIOR CAB INSULATION**
The cabin shall include 1.50" insulation in the ceiling and side walls, and 2.00" insulation in the rear wall to maximize acoustic absorption and thermal insulation.

**FENDER LINERS**
Full circular inner fender liners in the wheel wells shall be provided.

**WINDSHIELD**
A curved safety glass windshield shall be provided. The windshield shall be bonded in place to prevent leaks and to increase safety within the cabin (reference NHTSA report number DOT HS 806 693). For the greatest visibility, the windshield shall be a minimum of 34.75" tall, be of one (1) piece design, and wrap approximately 8.00" around each end of the A-pillars. The bottom of the windshield shall be no higher than 61.00" from the ground.

All cabin glass shall be tinted.

**WINDSHIELD WIPERS**
Windshield wipers with washer shall be provided that meet FMVSS and SAE requirements.

The windshield wipers shall sweep past the center of the windshield to provide maximum coverage in inclement weather. The wipers shall clean a minimum of 85 percent of the forward-facing area of the windshield.

The washer reservoir shall be able to be filled while standing on the ground and without raising the cabin.

**ENGINE TUNNEL**
Engine hood side walls are structural elements of the cabin and shall be constructed of .38" aluminum. The top shall be constructed of .19" aluminum and shall be tapered at the top for increased cabin space.

The engine hood shall be insulated for protection from heat and sound. The noise insulation keeps the dBA level below the limits stated in the current NFPA series 1900 pamphlet.

**CAB REAR WALL EXTERIOR COVERING**
The exterior surface of the rear wall of the cabin shall be overlaid with bright aluminum treadplate except for areas that are not typically visible when the cabin is lowered.
**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 cab lift controls shall be located on the pump operator’s panel in a convenient location. The controls shall include a permanently mounted raise/lower switch.

The cab shall be capable of tilting 35 degrees and 80 degrees with crane assist to accommodate engine maintenance and removal.

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). Dual 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 on the same side of the apparatus as the cab lift controls, between the chassis and cab frame when cab is in the raised position.

**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.

**GRILLE**
A bright finished aluminum mesh grille screen, inserted behind a bright finished grille surround, shall be provided on the front center of the cab.

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

**TRIM BAND ON CAB FACE**
A band of 22 gauge patterned stainless steel trim shall be installed across the front of the cab, from door hinge to door hinge. The trim band shall be centered on the headlights and applied with two-sided tape. A 0.625” self-adhesive trim strip shall be applied around the perimeter of the trim band.

**MIRRORS**
A Retrac, Model 613423, dual vision, motorized, west coast style mirror, with chrome finish, shall be mounted on each side of the front cab door with spring loaded retractable arms. The flat glass and convex glass shall be heated and adjustable with remote control within reach of the driver.
DOORS
To enhance entry and egress to the cab, the forward cab doors shall be a minimum of 37.50" wide x 62.37" high. The crew cab doors shall be located on the sides of the cab and shall be constructed in the same manner as the forward cab doors. The crew cab doors shall measure a minimum of 34.75" wide x 72.00" high.

The forward cab and crew cab doors shall be constructed of extruded aluminum with a nominal material thickness of .125". The exterior door skins shall be constructed from .090" aluminum.

The forward cab door windows shall include a 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.

The cab doors shall be provided with both interior (rotary knob) and exterior (keyed) locks exceeding FMVSS standards. The keys shall be Model 751. The locks shall be capable of activating when the doors are open or closed. The doors shall remain locked if locks are activated when the doors are opened, then closed.

A full length, heavy duty, stainless steel, piano-type hinge with a .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 chrome grab handle shall be provided on the inside of each cab and crew cab 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.

Door Panels
There shall be a full height brushed stainless steel door panel installed on the inside of all cab doors. The cab door panels shall be removable.

BLANK FACE PLATE
Blank face plate/s shall be provided, in place of standard storage pockets, in all available locations on the lower instrument panel console.

ELECTRIC OPERATED CAB DOOR WINDOWS
All four (4) cab doors shall be equipped with electric operated windows with one (1) flush mounted automotive style switch on each door. The driver's side door shall have four (4) switches, one (1) to control each door window.
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 second.

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

**ELECTRIC CAB DOOR LOCKS**
The front driver and officer doors shall have a door lock master switch that shall control all front and rear crew cab door locks. Each rear crew cab door shall have its own lock control.

There shall be one (1) concealed switch located in an easily accessible location on the pump panel that will unlock all the doors.

**CAB STEPS**
The forward cab and crew cab access steps shall be a full size two (2)-step design to provide the largest possible stepping surfaces for safe ingress and egress. (no exception). The bottom steps shall be designed with a grip pattern punched into bright aluminum treadplate material to provide support, slip resistance, and drainage. The bottom steps shall be a bolt-in design to minimize repair costs should they need to be replaced. The front cab steps shall be a minimum of 30.00" wide. The distance from the ground to the first cab step shall be approximately 20.00". The crew cab steps shall be 26.50" wide. The distance from the ground to the first crew cab step shall be approximately 22.00". All bottom steps shall have a depth of approximately 11.00". The distance from the bottom steps to the floor shall be approximately 16.00" in height and be limited to two (2) steps. (no exception). The leading edge of the top step shall be approximately 10.00" inboard from the leading edge of the bottom step to provide a user-friendly angled (stair stepped) step.

**CAB EXTERIOR HANDRAILS**
A 1.25" diameter slip-resistant, knurled aluminum handrail shall be provided adjacent to each cab and crew cab door opening to assist during cab ingress and egress.

**CAB AND CREW CAB STEP LIGHTS**
There shall be four (4) white 12-volt DC 9.00" LED light strips provided. The lights shall be installed recessed for protection into the top of the step extrusion:

- One (1) strip shall be installed in the driver's doorstep well.
- One (1) strip shall be installed in the passenger's doorstep well.
- One (1) strip shall be installed in the passenger's side crew cab doorstep well.
- One (1) strip shall be installed in the driver's side crew cab doorstep well.

The lights shall be activated when the battery switch is on and the adjacent door is opened.
**FENDER CROWNS**
Stainless steel fender crowns shall be installed at the cab wheel openings. The fender crowns shall have a radius outside corner that allows the fender crown to extend beyond the side wall of the front tires and allow the crew cab doors to open fully.

**WEBBED GRAB HANDLE INTERIOR CREWCAB DOORS**
Installed on the interior of each crew cab door stop strap shall be a red webbed grab handle. The grab handles shall be securely mounted.

**WEBBED GRAB HANDLE ON INTERIOR CAB DOORS**
Installed on the interior of the driver and officer cab door stop strap shall be a red webbed grab handle. The grab handles shall be securely mounted.

**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 and visibility to the exterior. The windows shall be approximately 29.00" wide x 32.00" high. The top of the window shall align with the top of the glass in the rear doors. The bottom of the glass shall align with the bottom of the crew cab door window.

One (1) fixed window with tinted glass shall be provided on each side of the cab, to the rear of the crew cab door. Each window shall be approximately 15.50" wide x 32.00" high. The top of the window shall align with the top of the glass in the rear doors. The bottom of the glass shall align with the bottom of the crew cab door window.

To enhance both visibilities out of and light penetration into the crew cab, two (2) bonded windows shall be provided in the front slanted portion of the raised roof. Each window shall be 8.00" high x 15.00" wide. The profile of the glass shall match the painted metal side sheet opening, creating a uniform threshold appearance. The windows shall be bonded to the vehicle using urethane adhesive.

**RAISED CAB ROOF COVERING**
Horizontal surfaces, on the raised cab roof portion only, shall be covered with bright aluminum treadplate. The fastening screws and the perimeter between the roof and the bottom of the aluminum treadplate, no more than 1.00" in from the edge of the aluminum treadplate, shall be properly caulked to prevent water from leaking under aluminum. Front and side warning lights shall not be mounted on top of treadplate. The treadplate shall extend and terminate next to the warning lights.

**STORAGE COMPARTMENTS**
Provided on each side of the crew cab, under the floor and accessible from the step area, shall be a storage compartment.

The driver side compartment dimensions shall be approximately 26.00" wide x 15.00" high x 10.25" deep with a clear door opening of 22.75" wide x 10.00" high.
The passenger side compartment dimensions shall be approximately 26.00" wide x 15.00" high x 16.00" deep with a clear door opening of 22.75" wide x 10.00" high. There shall be an 8.00" x 8.00" 45-degree notch in the left rear corner of this compartment for engine exhaust clearance.

The doors shall be in the stepwell area of the crew cab steps and shall be made of treadplate with the compartment interior painted to match the cab interior.

**ENCLOSURE AROUND LIGHT TOWER**
An enclosure shall be installed on three (3) sides of the light tower light on the cab roof. The back side shall be open to prevent water and debris from collecting in the Night Scan area. The enclosure shall be constructed out of aluminum and painted to match the cab roof. The sides of the enclosure shall be even with the top of the Night Scan light in the stored position.

**STORAGE COMPARTMENT ON CAB ROOF**
A storage compartment shall be provided on the crew cab roof. The compartment shall be located 4.00" forward of the rear wall of the cab and centered. It shall be constructed from aluminum and painted to match the crew cab roof.

The compartment shall be approximately 76.00" wide x 30.00" long x 10.00" high with an aluminum treadplate cover. Doors shall have lipped edges with a rubber seal for weather resistance, and an inner pan hinged on the inside. The cover shall be reinforced. Rubber latches shall secure the cover in the closed position.

Grab handles shall be provided to assist with lifting the cover and gas shocks shall be provided to hold the cover in the open position.

Black rubber grating shall be provided in the bottom of the compartment.

The compartment shall be bolted to the cab roof with 0.25" spacers to allow air flow between the compartment and cab roof.

**COMPARTMENT LIGHT**
There shall be a LED strip light installed on the cover opposite the hinged side. The light shall be controlled by an automatic door switch.

**CAB INTERIOR**
The cab interior shall be constructed of primarily metal (painted aluminum) to withstand the severe duty cycles of the fire service.

The officer side dash and center console shall be a flat top design with an upper beveled edge to provide easy maintenance and shall be constructed out of painted aluminum.

The switch panel area located to the right of the driver shall be constructed of painted aluminum with the switch panel being brushed stainless steel.
Only the instrument cluster shall be surrounded with a high impact ABS plastic contoured to the same shape of the instrument cluster.

The engine tunnel shall be painted aluminum.

For durability and ease of maintenance, the cab interior side walls shall be painted aluminum. The rear wall shall be painted aluminum.

The headliner shall be installed in both forward and rear cab sections. Headliner material shall be vinyl. A sound barrier shall be part of its composition. Material shall be installed on aluminum sheet and securely fastened to interior cab ceiling.

All wiring shall be placed in metal raceways. Routing through holes in tubing shall not be accepted due to chaffing that installation shall cause.

**CAB HEADLINER UPHOLSTERY**
The cab headliner upholstery shall be 36 oz light gray vinyl.

**CAB INTERIOR PAINT**
The following metal surfaces shall be painted gray, vinyl textured paint:

- Modesty panel in front of driver
- Vertical surface of dash in front of the officer
- Glove box in front of the officer (if applicable)
- Power distribution in front of the officer
- Rear heater vent panels

The top of the center console, officer dash, and driver instrument cluster housing shall be a flat dark charcoal gray color to reduce windshield glare.

The remaining cab interior metal surfaces shall be painted gray, vinyl texture paint

**CAB FLOOR**
The cab and crew cab flooring shall be constructed with bright aluminum treadplate. The vertical surfaces at the top of the step wells and the vertical area where the center floor rises shall be covered with aluminum treadplate. The front cab floor shall stop short of the wire raceway. The cover for the raceway shall be made of treadplate and wrap down the vertical surface for a one (1)-piece design cover.

**CAB DEFROSTER**
To provide maximum defrost and heating, a high-performance heater-defroster unit with shall be provided inside the cab. The defroster unit shall be strategically located under the forward portion of the center console. 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.

**CAB/CREW CAB HEATER**

Two (2) auxiliary heaters shall be provided inside the crew cab, one (1) in each outboard rear facing seat riser for easy service access. 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 seat riser and below the fronts of the driver and passenger seats, 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 in the center console in clear view of the driver. The control panel shall include highly visible, progressive LED indicators for both fan speed and temperature.

**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 60,000 BTU output that meets and exceeds the performance specification 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 condenser cover and mounting legs to be painted to match the cab roof.

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 (4.08 tons) rating that meets and 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 driver’s location
• Four (4) shall be directed towards the officer’s location
• Eight (8) 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 in the center console. For ease of operation, the control panels shall include variable adjustment for temperature and fan control.

**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 4 per 1.00" thickness.

**WINDOW DEFROST FANS**
Two (2) window defrost fans shall be mounted on the ceiling of the cab, one (1) on each side of the cab.

**SUN VISORS**
There shall be two (2) smoked 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 no retention bracket provided to help secure each sun visor in the stowed position.

A rubber trim piece shall be provided around the edge of each sun visor.

**GRAB HANDLES**
A handrail approximately 24.00" long and contoured to follow the shape of the cab windshield post shall be mounted to the forward portion of the driver and officer door openings.

A grab handle shall be mounted by the driver and passenger side crew cab doors to assist in entering the cab. The grab handle shall be securely mounted to the hinge side of the door frame.
ENGINE COMPARTMENT LIGHTS
There shall be two (2) 12-volt DC incandescent engine compartment lights installed in the engine compartment.

The lights shall have a .125" diameter weep hole in its lens to prevent moisture retention.

Each light shall include a switch on the lens that is powered up after the battery switch is activated.

- One (1) shall be installed on the underside of the cab to illuminate the top of the engine.
- One (1) shall be installed behind the engine access door to illuminate the engine fluid level dip sticks.

ACCESS TO ENGINE DIPSTICKS
To encourage preventive maintenance, the engine oil and transmission fluid dipsticks, shall be accessible through a door on the engine tunnel, inside the crew cab. The engine oil dipstick shall allow for checking only. The transmission dipstick shall allow for both checking and filling. An additional port shall be provided 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.

VELCRO STRAP(S) FOR MAP BOX
There shall be two (2) Velcro® strap(s) installed at final inspection.

MAP BOX
A map box with six (6) bins, open at top, shall be provided. The map box shall be located ship loose, customer will install. The map box shall be divided into six (6) bins, each bin shall slant 30 degrees from horizontal. The map box shall be constructed of .125" aluminum and shall be painted to match the cab interior. Two (2) rows of three (3) slots shall measure 12.00" long x 3.00" wide.

EQUIPMENT DRAWER
A slide-out storage drawer shall be provided below the center seat riser, between the driver and officer seats. The drawer shall be approximately 21.00" wide x 10.00" high x 15.00" deep. A stainless-steel flush round push to close latch shall be used to secure the drawer in the closed position. The face of the drawer shall cover the entire opening in the seat riser.

The drawer shall be constructed of 0.125" aluminum and painted to match the cab interior.

SEATING CAPACITY
The seating capacity in the cab shall be six (6).

DRIVER SEAT
A seat shall be provided in the cab for the driver. The seat design shall be a cam action type, with air suspension. For increased convenience, the seat shall include electric controls to adjust
the rake (15 degrees), height (1.75" travel) and horizontal (7.00" travel) position. Electric controls shall be located below the forward part of the seat cushion. To provide flexibility for multiple driver configurations, the seat shall have a reclining back, adjustable from 20 degrees back to 45 degrees forward. The seat back shall be a high back style with manual lumbar adjustment lever, for lower back support, 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).

The seat shall be furnished with a 3-point, shoulder type seat belt. To provide quick, easy use for occupants wearing bunker gear, the female buckle and seat belt webbing length shall meet or exceed the current NFPA 1901 edition and CAN/ULC - S515 standards. The seat belt shall be furnished with dual automatic retractors that shall provide ease of operation in the normal seating position.

To provide proper shoulder, elbow, and hip room, the driver seat shall be positioned such that the center line of the lower cushion is no less than 15.00" from the door pan and the edge of the cushion is approximately 4.00" away from the door pan providing more room to reach the seat belt buckle and encourage seat belt use (no exception).

**OFFICER SEAT**

A seat shall be provided in the cab for the passenger. 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. 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 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 seat shall be furnished with a 3-point, shoulder type seat belt. To provide quick, easy use for occupants wearing bunker gear, the female buckle and seat belt webbing length shall meet or exceed the current NFPA 1901 edition and CAN/ULC - S515 standards. The seat belt shall be furnished with dual automatic retractors that shall provide ease of operation in the normal seating position.

The officer seat shall have 24.00" of leg room as measured from the front of the seat cushion to the modesty panel below the officer dash. Furthermore, to provide proper shoulder, elbow, and hip room, the officer seat shall be positioned such that the center line of the lower cushion is no
less than 13.75” from the door pan and the edge of the cushion is approximately 4.00” away from the door pan providing more room to reach the seat belt buckle and encourage seat belt use (no exception).

**REAR FACING DRIVER SIDE OUTBOARD SEAT**
There shall be one (1) rear facing seat provided at the driver 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 indicating a seat is occupied but not buckled.

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 seat shall be furnished with a 3-point, shoulder type seat belt. To provide quick, easy use for occupants wearing bunker gear, the female buckle and seat belt webbing length shall meet or exceed the current NFPA 1901 edition and CAN/ULC-S515 standards. The seat belt shall be furnished with dual automatic retractors that shall provide ease of operation in the normal seating position.

To provide proper shoulder, elbow, and hip room, the crew area seat shall be positioned such that the center line of the lower cushion is no less than 13.75” from the door pan (no exception).

**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 indicating a seat is occupied but not buckled.

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 seat shall be furnished with a 3-point, shoulder type seat belt. To provide quick, easy use for occupants wearing bunker gear, the female buckle and seat belt webbing length shall meet or exceed the current NFPA 1901 edition and CAN/ULC-S515 standards. The seat belt shall be furnished with dual automatic retractors that shall provide ease of operation in the normal seating position.
To provide proper shoulder, elbow, and hip room, the crew area seat shall be positioned such that the center line of the lower cushion is no less than 13.75" from the door pan (no exception).

**FORWARD FACING DRIVER SIDE OUTBOARD SEAT**

There shall be one (1) forward facing seat provided at the driver side outboard position in the crew cab. To maximize accessibility to the crew cab, the seat shall be a minimum of 15.00" from the front of the cushion to the face of the seat back and the seat back shall be provided with 0 degree fixed recline angle. 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 indicating a seat is occupied but not buckled.

The seat back shall be an SCBA back style and be recessed into the rear wall. 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 seat shall be furnished with a 3-point, shoulder type seat belt. To provide quick, easy use for occupants wearing bunker gear, the female buckle and seat belt webbing length shall meet or exceed the current NFPA 1901 edition and CAN/ULC - S515 standards. The seat belt shall be furnished with dual automatic retractors that shall provide ease of operation in the normal seating position.

To provide proper shoulder, elbow, and hip room, the crew area seat shall be positioned such that the center line of the lower cushion is no less than 13.75" from the door pan.

**FORWARD FACING CENTER CABINET**

A forward-facing cabinet shall be provided in the crew cab at the center position, on top of the engine tunnel.

The cabinet shall be 26.50" wide x 35.50" high x 41.50" deep. The interior doors shall be web netting. A web door shall be provided on each side of the compartment, facing the crew cab doors. The netting is to be made with 2.00" wide nylon material with 2.00" openings. The nylon webbing shall be permanently fastened at the bottom of the cabinet and have seat belt buckle fasteners on the opposite side to secure it. A bar shall connect the fasteners and a pull strap shall be provided in the center. The clear door opening shall be 39.00" wide x 32.50" high.

The cabinet shall include one (1) infinitely adjustable shelf with a 1.25" up-turned lip painted to match the cab interior.

The cabinet shall include no louvers.

The cabinet shall be constructed of smooth aluminum and painted to match the cab interior.
### Cabinet Light
There shall be four (4) white LED strip lights installed, one (1) on each side of the cabinet door openings. The lights shall be controlled by a rocker switch, centered at each door opening.

### FORWARD FACING PASSENGER SIDE OUTBOARD SEAT
There shall be one (1) forward facing seat provided at the passenger side outboard position in the crew cab. To maximize accessibility to the crew cab, the seat shall be a minimum of 15.00" from the front of the cushion to the face of the seat back and the seat back shall be provided with 0 degree fixed recline angle. 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 indicating a seat is occupied but not buckled.

The seat back shall be an SCBA back style and be recessed into the rear wall. 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 seat shall be furnished with a 3-point, shoulder type seat belt. To provide quick, easy use for occupants wearing bunker gear, the female buckle and seat belt webbing length shall meet or exceed the current NFPA 1901 edition and CAN/ULC - S515 standards. The seat belt shall be furnished with dual automatic retractors that shall provide ease of operation in the normal seating position.

To provide proper shoulder, elbow, and hip room, the crew area seat shall be positioned such that the center line of the lower cushion is no less than 13.75" from the door pan (no exception).

### 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 location shall be one (1) shelf in the center forward facing EMS cabinet.

### SEAT UPHOLSTERY
All seat upholstery shall be 36-ounce leather grain 36 oz light gray vinyl Endure™ vinyl resistant to oil, grease and mildew. The cab shall have six (6) seating positions.

### AIR BOTTLE 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 bottle in the seat and shall exceed the NFPA standard of 9G. Bracket designs with manual restraints (belts, straps, buckles) that could be inadvertently
left unlocked and allow the SCBA to move freely within the cab during an accident, shall not be acceptable.

There shall be a quantity of five (5) SCBA brackets.

**ARM REST(S)**
The driver seat shall have a folding arm rest installed on inboard side only.

**ARM REST(S)**
The officer seat shall have a folding arm rest installed on inboard side only.

**SHOULDER HARNESS HEIGHT ADJUSTMENT**
All seating positions furnished with 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 six (6) seating positions shall have the adjustable shoulder harness.

**SEAT BELTS**
All seating positions in the cab and crew cab shall have red seat belts.

**HELMET STORAGE PROVIDED BY FIRE DEPARTMENT**
NFPA 1901, 2016 edition, section 14.1.7.4.1 requires a location for helmet storage be provided.

There is no helmet storage on the apparatus as manufactured. The fire department shall provide a location for storage of helmets.

**CAB DOME LIGHTS**
There shall be six (6) Weldon 808* series, dual LED dome lights with black bezels provided. Two (2) lights shall be mounted above the inside shoulder of the driver and officer and four (4) 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 white LED's shall be controlled by the door switches and the lens switch.

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

**CAB SPOTLIGHT**
There shall be two (2) Golight® Stryker™, Model 30**4, black LED spotlights located on the cab roof, behind the light bar, one each side. The spotlights shall be mounted on painted Z brackets.

These lights may be load managed when the parking brake is applied.

**SPOTLIGHT CONTROLLER**
There shall be one (1) wired dash mounted remote provided for each spotlight.
**SPOTLIGHT CONTROLLER LOCATIONS**
The remotes to control the spotlights shall be located one (1) within reach of the driver and one (1) within reach of the officer.

**PORTABLE HAND LIGHTS, PROVIDED BY FIRE DEPARTMENT**
NFPA 1901, 2016 edition, section 5.9.4 requires two portable hand lights mounted in brackets fastened to the apparatus.

The hand lights are not on the apparatus as manufactured. The fire department shall provide and mount these hand lights.

**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.

**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.
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 “dead-front” 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) (where applicable)
- 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) (where applicable)
- ABS (antilock brake system)
- MIL (engine emissions system malfunction indicator lamp) (where applicable)
- SRS (supplemental restraint system) fault (where applicable)
-- 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

**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.

**INDICATOR LAMP AND ALARM PROVE-OUT**

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

**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 decreases the panel backlighting intensity to a minimum level as the switch is held. The second switch position is the default position that does not affect the backlighting intensity. The third switch position increases 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 shall 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 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.

**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 up to four (4) switch panels in the overhead console on the driver's side, up to four (4) switch panels in the engine tunnel console facing the driver, up to four (4) switch panels in the overhead console on the officer's side and up to two (2) switch panels in the engine tunnel console facing the officer. All switches shall have backlit labels for low light applications.

**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 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)
- USB diagnostic port
- ABS diagnostic switch (blink codes flashed on ABS telltale indicator)
- Diesel particulate filter regeneration switch (where applicable)
- Diesel particulate filter regeneration inhibit switch (where applicable)

**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.

**AIR RESTRICTION INDICATOR**

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

**"DO NOT MOVE APPARATUS" INDICATOR**

A Whelen Model L32LRF red LED indicator beacon, located in the driving compartment, shall be illuminated automatically per the current NFPA requirements. The light shall be labeled "Do Not Move Apparatus If Light Is On".

The same circuit that activates the Do Not Move Apparatus indicator shall activate a pulsing alarm when the parking brake is released.

There shall be a switch located in the cab to deactivate or silence the alarm & light selected. The alarm system shall reactivate after the parking brake is applied and released.

**DO NOT MOVE TRUCK MESSAGES**

Messages shall be displayed on the color display located within sight of the driver whenever the Do Not Move Truck 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 (where applicable):

- 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
• DS Ladder Rack Down (Driver Side Ladder Rack Down)
• PS Ladder Rack Down (Passenger Side Ladder Rack Down)
• Deck Gun Not Stowed
• Lt Tower Not Stowed (Light Tower 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.

**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 six (6) rocker-type switches each rated for two hundred thousand (200,000) cycles. Panels with less than six (6) switches shall include indicators or blanks. The switch panel(s) shall be located in the "overhead" position above the windshield on the driver and passenger side to allow for easy access.

The switches shall be rocker-type and include an integral indicator light. For quick, visual indication the switch shall be illuminated whenever the switch is active. A 2-ply, scratch resistant laser engraved 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 are integral to the switch panel assembly.

**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.

**SPARE CIRCUIT**
There shall be three (3) pair of wires, including a positive and a negative, installed on the apparatus.

The above wires shall have the following features:

• The positive wire shall be connected directly to the battery power
• The negative wire shall be connected to ground
• Wires shall be protected to 15 amps at 12 volts DC
• Power and ground shall terminate officer side dash area
• Termination shall be with 15-amp, power point plug with rubber cover
• Wires shall be sized to 125 percent of the protection

The circuit(s) may be load managed when the parking brake is set.
SPARE CIRCUIT
There shall be two (2) pair of wires, including a positive and a negative, installed on the apparatus.

The above wires shall have the following features:

The positive wire shall be connected directly to the battery switched power.

The negative wire shall be connected to ground.

Wires shall be protected to 40 amps at 12 volts DC.

Power and ground shall terminate in the center console area between the driver and officer seat.

Termination shall be with 3/8" studs and plastic covers.

Wires shall be sized to 125% of the protection.

This circuit(s) may be load managed when the parking brake is set.

INFORMATION CENTER
An information center employing a 7.00" diagonal touch screen color LCD display shall be encased in an ABS plastic housing.

OPERATION
The information center shall be designed for easy operation for everyday use.

The page button shall cycle from one screen to the next screen in a rotating fashion.

A video button shall allow a NTSC signal into the information center to be displayed on the LCD. Pressing any button while viewing a video feed shall return the information center to the vehicle information screens.

A menu button shall provide access to maintenance, setup and diagnostic screens.

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

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
• Exterior Ambient Temperature
• Time (12- or 24-hour mode)
• The information center shall utilize an "Alert Center" to display text messages for audible alarm tones. The text messages shall be written to 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 background color for the "Alert Center" shall change to indicate the severity of the "warning" message. If a warning and a caution condition occur simultaneously, the red background color shall be shown for all alert center messages.
• A label for each button shall exist. The label shall indicate the function for each active button for each screen. Buttons that are not utilized on specific screens shall have a button label with no text.

PAGE SCREENS
The bidder shall provide templates of following screens:

• Load Manager Screen
• Individual Load Shed Priority Screen
• Load Status Screen
• Do Not Move Truck Screen

MENU SCREENS
The bidder shall provide templates of the following screens: System Information

• Display Brightness
• Configure Video Mode
• Startup Screen
• Date & Time
• View Active Alarms
• System Diagnostics
• Module diagnostics information

Button functions and button labels may change with each screen.

OPERATION
The information center shall be designed for easy operation for everyday use.

The page button shall cycle from one screen to the next screen in a rotating fashion.

A menu button shall provide access to maintenance, setup and diagnostic screens.

All other button labels shall be specific to the information being viewed.
VEHICLE DATA RECORDER
There shall be a vehicle data recorder (VDR) capable of reading and storing vehicle information provided.

The information stored on the VDR can be downloaded through a USB port mounted in a convenient location determined by cab model. A USB cable can be used to connect the VDR to a laptop to retrieve required information. The program to download the information from the VDR will be available to download on-line.

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
- Seat Belt Buckled Status - Yes/No by Position
- Master Optical Warning Device Switch - On/Off
- Time - 24 Hour Time
- Date - Year/Month/Day

Seat Belt Monitoring System
A seat belt monitoring system (SBMS) shall be provided on the color display and in the center overhead of the cab instrument panel. The SBMS shall be capable of monitoring up to 10 seating positions indicating the status of each seat position per the following:

- Seat Occupied & Buckled = Green LED indicator illuminated
- Seat Occupied & Unbuckled = Red LED indicator with audible alarm
- No Occupant & Buckled = Red LED indicator with audible alarm
- No Occupant & Unbuckled = No indicator and no alarm

The seat belt monitoring screen shall become active on the color display when:

- The home screen is active:
  - and there is any occupant seated but not buckled or any belt buckled with an occupant.
  - and there is no other Do Not Move Apparatus conditions present. As soon as all Do Not Move Apparatus conditions are cleared, the SBMS shall be activated.

The SBMS shall include an audible alarm that shall warn that an unbuckled occupant condition exists, and the parking brake is released, or the transmission is not in park.
INTERCOM SYSTEM
There shall be digital, dual radio interface, intercom located in the front of the cab within easy reach of the officer in the cab. The front panel shall have master volume, and squelch controls with illuminated indicators, allowing for independent level setting of radio and auxiliary audio devices.

There shall be two (2) radio listen only / transmit controls, allowing for simulcast interoperability with select, monitor, receive, and transmit indicators. There shall be two (2) auxiliary audio inputs with select and receive indicators.

There shall be one (1) wireless base station for up to five (1-5) headset users provided.

The wireless base station shall have a 100’ to 1100’ range, line of sight. Objects between the transmitter and receiver affect range.

The following Firecom components shall be provided:

- One (1) 5200D Intercom
- One (1) WB505R wireless base station (1-5 wireless positions)
- All necessary power and station cabling

RADIO / INTERCOM INTERFACE CABLE
The apparatus manufacturer shall supply and install two (2) radio interface cables before delivery of the vehicle.

The radio equipment to be used by the customer shall be:

- Make of First Radio: Motorola High Power, Model Number?
- Make of Second Radio: Motorola Mid Power, Model Number?

WIRELESS CONVERTIBLE, INTERCOM ONLY HEADSET
There shall be two (2) Firecom™, Model UHW-505 wireless convertible style, intercom only headset(s) provided. A heavy duty coiled 12 volt charging pigtail with plug shall be provided in the crew cab area.

Each headset shall feature:

- Noise cancelling electric microphone
- Flexible microphone boom
- Ear seals with 20 dB noise reduction
- Programmable Microphone transmit button
- Rechargeable battery operates 24 hours on a full charge
- IP-66 when worn
- Both headsets should be yellow in color
**WIRELESS CONVERTIBLE, RADIO TRANSMIT ONLY HEADSET**
There shall be two (2) Firecom™, Model UHW-507, wireless convertible style, radio transmit headset(s) provided. A heavy duty coiled 12 volt charging pigtail with plug shall be provided driver's seat and officer seat.

Each headset shall feature:

- Noise cancelling electric microphone
- Flexible microphone boom
- Ear seals with 20 dB noise reduction
- Stereo Listen-Through Ear dome microphones
- Radio Push To Transmit button (Left or Right Side)
- Rechargeable battery operates for 24 hours on a full charge
- IP-66 when worn
- One headset should be blue in color and one headset should be red in color

**HEADSET HANGERS**
There shall be four (4) headset hanger(s) installed driver's seat, officer's seat, driver's side outboard rear facing seat and passenger's side outboard rear facing seat. The hanger(s) shall meet NFPA 1901, Section 14.1.11, requirement for equipment mounting.

**KNOX-BOX®**
There shall be one (1) Knox-Box(s) sent to the apparatus manufacturers preferred installer and installed at Precision Installations went over the location with the customer. Specific shipping requirements shall be followed.

A "technician's key" shall be provided by the customer for each Knox Box. The box cannot be installed without a compatible technician's key.

**TWO WAY RADIO INSTALLATION**
There shall be two (2) customer supplied two-way radio(s) sent to the apparatus manufacturers preferred radio installer to be installed on the top of the center dash console per mark up instrument switch panel drawing per the shipping document.

No antenna mount or whip shall be included in this option.

Specific shipping requirements shall be followed.

**BRACKET ONLY INSTALLATION**
There shall be one (1) customer supplied Thermal Imaging camera charging bracket(s) sent to the apparatus manufacturers preferred installer to be installed Precision Installations went over locations with the customer.

Specific shipping requirements shall be followed.
TWO-WAY RADIO CABLE INSTALLATION
There shall be one (1) customer supplied two-way radio remote head cable(s) sent to the apparatus manufacturers preferred radio installer for installation. The cable shall be run from the radio to power supply.

Specific shipping requirements shall be followed.

TWO WAY RADIO SPEAKER INSTALLATION
There shall be one (1) customer supplied two-way radio speakers sent to the apparatus manufacturers preferred third party installer to be installed per the customers instructions at post paint inspection.

Specific shipping requirements shall be followed.

RADIO ANTENNA MOUNT
There shall be three (3) standard 1.125", 18 thread, NMO Type antenna mounting base(s) installed on the cab roof spaced as far apart as possible on the cab roof with high efficiency, low loss, coaxial cable(s) routed within the cab / crew area to route cables to center of the instrument panel. A weatherproof cap shall be installed on the mount.

VEHICLE CAMERA SYSTEM
There shall be a color vehicle camera system provided.

There shall be color cameras located on the passenger side of the cab activated with the right turn signal and at the rear of the vehicle, as close to center as possible, activated when the vehicle is put into reverse. The camera images shall be displayed on the provided apparatus driver's vehicle information center display. Audio from the rear camera shall be via an amplified speaker with volume control on the instrument panel.

Safety Vision components shall include:

- One (1) 620 color rear camera
- 622 color side camera(s) as defined above
- All necessary cables

VEHICLE CAMERA GUARD
There shall be one (1) aluminum treadplate guard(s) fastened over the vehicle camera(s) located at the rear.

ELECTRICAL POWER CONTROL SYSTEM
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.

**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.

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

**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 indication with intermittent alarm
- Red warning indication with steady tone alarm

**TECH MODULE WITH WIFI**
An in-cab module shall provide WIFI wireless interface and data logging capability (no exception). The WIFI interface shall comply with IEEE 802.11 b/g/n capabilities while communicating at 2.4 Gigahertz. The module shall provide an external antenna connection allowing a line of site communication range of up to 300 feet with a roof mounted antenna.

The module shall transmit a password protected web page to a WIFI enabled device (i.e. most smart phones, tablets or laptops) allowing two levels of user interaction. The firefighter level shall allow vehicle monitoring of the vehicle and firefighting systems on the apparatus.

A USB connection shall be provided on the Tech Module. It shall provide a means to download data logger information and update software in the device.
PROGNOSTICS
A software-based vehicle tool shall be provided to predict remaining life of the vehicle’s critical fluid and events (no exception).

Prognostics shall include:

- Engine oil and filter
- Transmission oil and filter
- Pump oil (if equipped)
- Foam oil (if equipped)
- Aerial oil and filter (if equipped)

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 or wireless enabled device.

The service and maintenance software shall be easy to understand and use and can view system input/output (I/O) information.

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.

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.

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

All perimeter lights and scene lights (where applicable) shall be deactivated when the parking brake is released.

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 or immediately if the vehicle is put into gear.

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 10Khz-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 10Khz-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.

ELECTRICAL
All 12-volt electrical equipment installed by the apparatus manufacturer shall conform to modern automotive practices. All wiring shall be high temperature crosslink type. Wiring shall be run, in loom or conduit, where exposed and have grommets where wire passes through sheet metal. Automatic reset circuit breakers shall be provided which conform to SAE Standards. Wiring shall be color, function and number coded. Function and number codes shall be continuously imprinted on all wiring harness conductors at 2.00" intervals. Exterior exposed wire connectors
shall be positive locking, and environmentally sealed to withstand elements such as temperature extremes, moisture and automotive fluids.

Electrical wiring and equipment shall be installed utilizing the following guidelines:

1. All holes made in the roof shall be caulked with silicon, rope caulk is not acceptable. Large fender washers, liberally caulked, shall be used when fastening equipment to the underside of the cab roof.

2. 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.

3. Electrical components designed to be removed for maintenance shall not be fastened with nuts and bolts. Metal screws shall be used in mounting these devices. Also, a coil of wire shall be provided behind the appliance to allow them to be pulled away from mounting area for inspection and service work.

4. Corrosion preventative compound shall be applied to all terminal plugs 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).

5. All lights that have their sockets in a weather exposed area shall have corrosion preventative compound added to the socket terminal area.

6. All electrical terminals in exposed areas shall have silicon (1890) applied completely over the metal portion of the terminal.

All lights and reflectors, required to comply with Federal Motor Vehicle Safety Standard #108, shall be furnished. Rear identification lights shall be recessed mounted for protection. Lights and wiring mounted in the rear bulkheads shall be protected from damage by installing a false bulkhead inside the rear compartments.

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 the purchaser at time of delivery.

**BATTERY SYSTEM**

There shall be four (4) 12-volt Exide®, Model 31S950X3W, batteries that include the following features shall be provided:

- 950 CCA, cold cranking amps
- 190-amp reserve capacity
- High cycle
- Group 31
- Rating of 3800 CCA at 0 degrees Fahrenheit
- 760 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.

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

MASTER BATTERY SWITCH
There shall be a master battery switch provided within the cab within easy reach of the driver 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.

BATTERY COMPARTMENTS
Batteries shall be stored in a well-ventilated location under the cab, between the chassis frame rails, ahead of the front wheels. The battery compartments shall be constructed of 3/16” steel plate and be designed to accommodate a maximum of six (6) group 31 batteries in each compartment. The battery hold-downs shall be of a non-corrosive material. All bolts and nuts shall be stainless steel.

Heavy-duty battery cables shall be used to provide maximum power to the electrical system. Cables shall be color-coded.

Battery terminal connections shall be coated with anti-corrosion compound. Battery solenoid terminal connections shall be encapsulated with semi-permanent rubberized compound.

JUMPER STUDS
One (1) set of battery jumper studs with plastic color-coded covers shall be remotely located at the front left side corner of the cab for easy jumper cable access.

BATTERY CHARGER
A Kussmaul Autocharge 35/10, Model 091-35-10, single battery charger shall be provided. A bar graph display indicating the state of charge shall be provided.

The battery saver circuit shall be capable of supplying up to 10 amps for external loads such as hand light or auxiliary radio batteries.

The battery charger shall be wired to the 120-volt shoreline to activate automatically when power is connected.

Battery charger shall be in the cab behind the officer seat.
The battery charger indicator shall be located near the driver's seat riser with special bracketry.

**KUSSMAUL AUTO EJECT FOR SHORELINE**

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

The shoreline inlet(s) shall include yellow weatherproof flip up cover(s).

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

The shoreline(s) shall be connected to the battery charger and receptacles in the cab.

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 Rating (amps)
- Phase
- Frequency

The shoreline receptacle shall be located on the driver side of cab, above wheel.

**BATTERY BOX COVER**

A removable cover shall be fabricated and installed over the battery box for protection. The cover shall be made from aluminum treadplate material.

**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.

**ELECTRONIC LOAD MANAGER**

An electronic load management (ELM) system shall be provided to monitor the vehicles 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 activate before any electric loads are shed and deactivate with the service brake.
  - 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

**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:
Specification for the Deerfield-Bannockburn Fire Department dated 10/22/19

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

**HEADLIGHTS**
There shall be four (4) JW Speaker®, Model 8800, 4” x 6” rectangular LED lights mounted in the front quad style, chrome housing on each side of the cab grille:

- the outside light on each side shall contain a part number 055***1 low beam module
- the inside light on each side shall contain a part number 055***1 high beam module
- the headlight to include chrome bezels

The low beam lights shall be activated when the headlight switch is on.

The high beam and low beam lights shall be activated when the headlight switch and the high beam switch is activated.

**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.

**ADDITIONAL DIRECTIONAL LIGHT**
There shall be two (2) Whelen, Model 60A00TAR, amber LED populated arrow directional light(s) provided One each side on the back of the cab down low and toward the outside.

Each light shall be provided with a chrome flange.

**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.
**INTERMEDIATE LIGHT**
There shall be two (2) Truck-Lite®, Model 60421Y, amber LED lights furnished, one (1) each side, horizontally in the rear fender panel. The light shall double as a turn signal and marker light.

A stainless-steel trim shall be included with this installation.

**FRONT CAB SIDE DIRECTIONAL/MARKER LIGHTS**
There shall be two (2) Truck-Lite®, Model 19036Y, amber LED lights installed to the outside of the chrome wrap around bezel, one (1) on each side of the cab.

The lights shall activate as marker lights with the headlight switch and directional lights with the corresponding directional circuit.

**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

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

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 and CMVSS 108 requirements.

**REAR FMVSS LIGHTING**
The rear stop/tail and directional LED lighting shall consist of the following:

- Two (2) Whelen®, Model M6BTT, red LED stop/tailights
- Two (2) Whelen, Model M6T, amber LED arrow turn lights

The lights shall be provided with color lenses.

The lights shall be mounted in a polished combination housing.

There shall be two (2) Whelen Model M6BUW, LED backup lights provided in the taillight housing.

**LICENSE PLATE BRACKET**
There shall be one (1) license plate bracket located below the tailboard on a removable bolt-on bracket located on the driver side.

A white LED light shall 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.

**LIGHTING BEZEL**
There shall be two (2) Whelen, Model M6FCV3P, three (3) place chromed ABS housings with logos provided for the rear M6 series stop/tail, directional, and back up lights.

**BACK-UP ALARM**
A PRECO, Model 1040, 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.

**CAB PERIMETER SCENE LIGHTS**
There shall be four (4) Amdor, Model AY-LB-12HW020, 350 lumens each, 20.00" white LED strip lights provided, one (1) for each cab door.
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.

**PUMP HOUSE PERIMETER LIGHTS**
There shall be two (2) Amdor, Model AY-LB-12HW012, 190 lumens each, 12.00" LED weatherproof strip lights with brackets provided under the pump panel running boards, centered front to rear as much as possible, one (1) each side.

The lights shall be activated when the battery switch is on and controlled by the same means as the body perimeter lights.

**BODY PERIMETER SCENE LIGHTS**
There shall be two (2) Amdor, Model AY-LB-12HW020, 350 lumens, 20.00" long, white LED’s, 12-volt DC lights provided at the rear step area of the body, one (1) each side shining to the rear.

The perimeter scene lights shall be activated when the parking brake is applied.

**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 exceptional 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.

**SIDE SCENE LIGHTS**
There shall be one (1) Whelen, Model 9SC0ENZR LED scene light(s) with chrome flange installed on the side of the apparatus, Above the pass side crew cab door on the light tower enclosure as far aft as possible.

A control for the light(s) selected above shall be the following:

from the passenger's side cab scene light option control

no additional switch location

opening the passenger's side cab or crew cab doors

no additional switch location

These lights may be load managed when the parking brake is set.
SIDE SCENE LIGHTS
There shall be one (1) Whelen, Model 9SC0ENZR LED scene light(s) with chrome flange installed on the side of the apparatus, above the driver's side crew cab door on the light tower enclosure as far aft as possible.

A control for the light(s) selected above shall be the following:

from the driver's side cab scene light option control
no additional switch location
opening the driver's side cab or crew cab doors
no additional switch location

These lights may be load managed when the parking brake is set.

12 VOLT LIGHTING
There shall be two (2) Whelen® Model P*H2*, 17,750 lumens 12 volt DC LED light(s) with flood optics installed on the apparatus located, driver side in the forward and rear upper corners or the body and hatch compartments, controlled by the same switches as the scene lights on the cab but not controlled by the door switches.

The painted parts of this light assembly to be red number 106
The light(s) to be installed in a 15-degree vertical recessed chrome trim.

The lights shall be controlled by a switch at the driver's side switch panel, by a switch at the driver's side pump panel and by a switch at the passenger's side switch panel.

The light(s) may be load managed when the parking brake is applied.

12 VOLT LIGHTING
There shall be two (2) Whelen® Model P*H2*, 17,750 lumens 12-volt DC LED light(s) with flood optics installed on the apparatus located, on the rear of the body, one each side as high as possible.

The painted parts of this light assembly to be red number 106
The light(s) to be installed in a 15-degree vertical recessed chrome trim.

The lights shall be controlled by a switch at the driver's side switch panel, by a switch at the driver's side pump panel and by a switch at the passenger's side switch panel.

The light(s) may be load managed when the parking brake is applied.
12 VOLT LIGHTING
There shall be two (2) Whelen® Model P*H2*, 17,750 lumens 12 volt DC LED light(s) with flood optics installed on the apparatus located, passenger side in the forward and rear upper corners or the body and hatch compartments, controlled by the same switches as the scene lights on the cab but not controlled by the door switches.

The painted parts of this light assembly to be red number 106

The light(s) to be installed in a 15-degree vertical recessed chrome trim.

The lights shall be controlled by a switch at the driver's side switch panel, by a switch at the driver's side pump panel and by a switch at the passenger's side switch panel.

The light(s) may be load managed when the parking brake is applied.

12 VOLT LIGHTING
There shall be two (2) Whelen® Model P*H2*, 17,750 lumens 12-volt DC light(s) with flood optics provided on the front visor, one (1) on the driver's side and one (1) on the passenger's side.

The housing(s) painted parts of this light assembly to be black. The light(s) shall be controlled by a switch at the driver's side switch panel, by a switch at the driver's side pump panel and by a switch at the passenger's side switch panel.

These light(s) may be load managed when the parking brake is applied.

WALKING SURFACE LIGHT
There shall be Model FRP, 4" round black 12-volt DC LED floodlight(s) with bolt mount provided to illuminate the entire designated walking surface on top of the body.

The light(s) shall be activated when the body step lights are on.

WATER TANK
Booster tank shall have a capacity of 750 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.

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

Tank shall be baffled in accordance with NFPA Bulletin 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 conditions.

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 will be sized dependent on the tank to pump plumbing 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.

Enough crossmembers shall be provided to properly support bottom of tank. Crossmembers shall be constructed of steel bar channel or rectangular tubing.

Tank shall "float" in 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 vehicle.

Mounting system shall be approved by the tank manufacturer.

Fill tower shall be constructed of .50" polypropylene and shall be a minimum of 8.00" wide x 14.00" long.

Fill tower shall be furnished with a .25" thick 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.

The overflow shall be routed using a section of 4.00" PVC at the hose end, so it does not dump water on any chassis component.
### POLY TANK NOTCH
A notch shall be provided at the front of the poly water tank. The notch shall be large enough for hose, hydraulic lines, or electrical wiring at the front of the hose bed.

### WATER TANK RESTRAINT
A heavy-duty water tank restraint shall be provided.

### BODY HEIGHT
The height of the body shall be approximately 101.00" from the bottom of the body to the top of the body.

### HOSE BED
The hose bed shall be fabricated of corrosion resistant, low carbon austenitic, brushed and painted 304L stainless steel.

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

A cross divider shall be provided at the front of the hose bed before the tank transitions from the lower section to the upper section. The divider shall run from the top of the side sheet down below the hose bed grating.

The hose bed shall be directly above the rear compartment door. The dimension from the ground shall be approximately 67.00" depending on the suspension and equipment load.

The hose bed shall be a minimum of 85.00" long.

Hose bed shall accommodate 1000' of 4" on the driver side, 1000' of 3" on the passenger side.

### HOSE BED DIVIDER
One (1) adjustable hosebed divider 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.

### HOSE BED HOSE RESTRAINT
The hose in the hose bed shall be restrained by a black nylon Velcro® strap at the top of the hose bed. 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 seat belt buckle fasteners. The webbing shall have straps connected with seat belt buckle fasteners located at the rear body sheet below the hose bed.

**CUTOUT, HANDHOLD**
Two (2) cutouts with radiused corners shall be provided at the rear of the one (1) hose bed divider(s).

The cutout(s) shall be located one at 4’ and one at 6’ from the tailboard.

The hose bed divider(s) shall be connected to the upper rear handrail.

**REMOVABLE HOSE TRAY(S) IN HOSE BED**
There shall be four (4) removable U-shaped hose tray(s) provided under the hose bed.

One tray shall be sized to hold 100’ of 2.50” The other three trays should be sized to hold 100’ of 1.75” hose with nozzle.

Tray shall be fabricated of poly with two (2) hand hold cutouts on each side. Tray shall slide on stainless steel angles. Bottom of angles shall be lined with dura-surf, anti-friction poly slides for ease of removal. A stop shall be provided at the front of the tray to prevent the tray from moving forward and a strap shall be supplied at the rear.

Tray shall be located under the hose bed permanent shelve with grating, two each side of the center divider, stack separately one on top of each other.

**HOSE BED COVER**
A two (2) section hose bed cover, constructed of .125” bright aluminum treadplate shall be furnished. The cover shall be hinged with full-length, stainless-steel piano hinge. The sides shall be slanted down.

The cover shall be reinforced so that it can support the weight of a man walking on the cover.

The cover is designed with the left cover opening first.

If access to the water tank fill tower is blocked by the hose bed cover, then a hinged door shall be provided in it so that the tank may be filled without raising cover doors.

Chrome grab handles and four (4) gas filled cylinders shall be provided to assist in opening and closing the cover. A handrail is to be provided at the rear, in the center of the support, to assist in opening the cover.

**HOSE BED STAY ARM COVER**
An additional positive stay arm shall be provided at the front of the cover. The additional stay arms shall be a flat bar, mechanical design.
**HOSEBED RESTRAINT REAR**

There shall be a red vinyl flap installed at the rear of the hosebed. The vinyl flap shall be mounted to a metal rod. Carabiner style hooks shall be attached to the top hosebed frame that the metal rod at the top of the flap shall snap into.

There shall be three (3) grommets spaced along the outboard edges of the vinyl flap to allow the flap to fold up and allow the grommets to be hooked into the hooks at the top of the hosebed frame. The first of the grommets shall be at the bottom along the outboard edge. The next two grommets shall be along the outboard edge as well located at approximately 21” and 23” from the bottom of the flap.

There shall be five (5) pieces of Velcro, 4” wide by 16.00” length, spaced evenly across the flap middle at approximately 22.00” from the base of the flap. A strip of Velcro 4.00” wide shall be provided along the outboard face of the flap at the bottom of the flap. This Velcro allows the flap to be folded up and held in place with Velcro providing access to the lower part of the hosebed without exposing the top.

The flap shall have two (2) orange straps that loop through footman loops at the bottom of the hosebed and fasten with Velcro fasteners. A poly .75” diameter rod shall be sewn into the base of the vinyl flap with room for the above-mentioned grommets at each end.

**LETTERING, HOSEBED COVER**

There shall be white vinyl lettering provided on rear flap of the hosebed cover.

There shall be ten (10) letters provided.

The lettering shall be approximately 10.00” high.

The lettering designation on the cover shall be yellow.

**RUNNING BOARDS**

A running board shall be provided on each side of the front body to allow access to the backboard/crosslay storage area. The running boards shall be designed with a grip pattern punched into .125” bright aluminum treadplate material providing support, slip resistance, and drainage.

The running board shall have a flip out section design that allows easier access to the full width equipment area above. The flip out section shall be tied to the “do not move truck indicator” with a sensor when it is flipped out. There shall be a latch provided that secures the flip out section when not in use.

**TAILBOARD**

The tailboard shall be constructed of .125” bright aluminum treadplate and spaced 1.00” from the body, as well as supported by a structural steel assembly.
The tailboard area shall be 15.00" 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 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.

**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.

**TOW BAR**

A tow bar shall be installed under the tailboard at center of truck.

Tow bar shall be fabricated of 1.00" CRS bar rolled into a 3.00" radius.

Tow bar assembly shall be constructed of .38" structural angle. When force is applied to the bar, it shall be transmitted to the frame rail.

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

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

**COMPARTMENTATION**

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, or any grade of ferritic or martensitic stainless, 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 are pre-punched prior to construction to provide accuracy and rounded corners to prevent stress risers 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 (no exception).

Side 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, or formed bright aluminum treadplate.

The top of the compartment shall be covered with bright aluminum treadplate rolled over the edges on the front, and rear. These covers shall have the corners welded.

The aluminum treadplate covers shall not be used to form the compartment ceilings, but rather they shall be a separate component (no exception).

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.

**UNDERBODY AND WATER TANK SUPPORT SYSTEM**

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

The backbone of the body support system shall begin with the chassis frame rails which is the strongest component of the chassis and is designed for sustaining maximum loads. A detailed explanation of this system shall be explained in the proposal (no exceptions).

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

**AGGRESSIVE WALKING SURFACE**

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.

**LOUVERS**

All body compartments 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 wheel shall not have louvers.
TESTING OF BODY DESIGN
Body structural analysis shall be fully tested. Proven engineering and test techniques such as finite element analysis and strain gauging have been performed with special attention 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.

FEA shall have been performed on all substructure components.

LEFT SIDE COMPARTMENTATION
The left side compartmentation shall consist of three rollup door compartments.

A full height, rollup door compartment ahead of the rear wheels shall be provided. The 31” wide pump operator's panel shall be in this compartment. A vertical partition shall be provided on the right side of the pump panel. The interior dimensions of the remaining space in this compartment shall be 25.25” wide x 53.63” high x 26.00” deep. The clear door opening shall be a minimum of 59.25” wide x 53.63” high. A rollup door compartment over the rear wheels shall be provided. The interior dimensions of this compartment shall be 60.00” wide x 22.88” high x 26.00” deep. The clear door opening shall be a minimum of 57.25” wide x 22.88” high.

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.

A full height, rollup door compartment behind the rear wheels shall be provided. The interior dimensions of this compartment shall be 51.75” wide x 54.63” high x 26.00” deep. The clear door opening shall be a minimum of 49.25” wide x 54.63” high. All dimensions are approximate.
The roll up door spool shall be installed in a recess above the compartment ceiling. All compartments shall include a drip pan below the roll of the door. The drip pan shall be installed level with the compartment ceiling. The interior height of the compartments shall be measured from the compartment floor to the ceiling. The depth of the compartments shall be measured from the back wall to the inside of the door frame.

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

**RIGHT SIDE COMPARTMENTATION**

A full height jump off compartment with a roll-up door 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 62.00” 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 59.00” 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 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.
SIDE COMPARTMENT ROLLUP DOOR(S)
There shall be six (6) compartment doors installed on the side compartments. The doors shall be double faced, aluminum construction, painted one (1) color to match the lower portion of the body and manufactured by R-O-M Corporation.

The slats shall be double wall box frame extrusion. The exterior surface shall be flat, and the interior surface shall be concave to help loose equipment fall to the ground and prevent it from jamming the door.

Between each slat shall be a PVC inner seal to prevent metal to metal contact and prevent dirt or moisture from entering the compartments.

A non-locking lift bar to be provided for each roll-up door. The lift bar shall be located at the bottom of the door and have latches on the outer extrusion of the door frame. A ledge shall be supplied over the lift bar as additional area to aid in closing the door.

Each door shall have a 4.00" counterbalance to assist in lifting.

A heavy-duty magnetic switch shall be used for the control of open compartment door warning lights.

REAR COMPARTMENTATION
A tool compartment shall be provided at the rear of the apparatus. The compartment shall be 26.00" wide x 8.00" high x 26.00" deep.

REAR COMPARTMENT DOOR
A drop-down door constructed of smooth aluminum with a D-ring latch shall be provided.

COMPARTMENT LIGHTING
There shall be six (6) compartment(s) with two (2) white 12-volt DC 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. The dual light strips shall be in compartment(s): in the side body compartments.

Any remaining compartments without light strips shall have a 6.00" diameter Truck-Lite, Model: 79384 light. Each light shall have a number 1076 one filament, two wire bulb.

Opening the compartment door shall automatically turn the compartment lighting on.

COMPARTMENT LIGHTING, ADDITIONAL
There shall be one (1) LED strip light(s) provided in the compartment(s) located above the inside door opening of the rear step tool compartment mounted front to back in the upper pass side corner. Each light shall be 9.00" in length.

Opening the compartment door(s) shall automatically turn the compartment lighting on.
HATCH COMPARTMENTS
Hatch compartments with two (2) lift-up, top opening hatch doors shall be provided above the left and right-side body compartments. Each hatch compartment shall extend the full length of the side body compartmentation x 28.00" wide x 31.00" maximum depth. The compartments shall extend the full length of the side body.

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 treadplate.

Two (2) lift-up, bright aluminum treadplate 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.

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.

MOUNTING TRACKS
There shall be recessed tracks installed vertically to support the adjustable shelf(s).

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.

ADJUSTABLE SHELVES
There shall be four (4) shelves with a capacity of 500 lb. provided. The shelf construction shall consist of 0.188" aluminum painted spatter gray. 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 0.12" thick stamped plated brackets and bolts.
The location shall be 1 in compartment LS3 above the adjustable slide out tray, 2 in compartment RS1 in the upper section and 1 in compartment RS2.

The side height of the shelf/shelves shall be as follows:

- Front: 2.00" high
- Rear: 2.00" high
- Left & Right Sides: 2.00" high

**ADJUSTABLE SHELVES**

There shall be one (1) shelf provided in compartment RS3 above the standard adjustable shelf and installed with the flanges down. The shelf construction shall consist of .188" aluminum painted spatter gray. A capacity rating shall not be available on this item due to a reduced side height being less than 2.00". 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 side height of the shelf/shelves shall be as follows:

- Front: 1.00" high
- Rear: 2.00" high
- Left & Right Sides: 2.00" high

**SLIDE-OUT ADJUSTABLE HEIGHT TRAY**

There shall be five (5) slide-out trays provided.

Each tray shall have 2.00" high sides and a capacity rating of up to 250 lb. in the extended position.

Each tray shall be painted to match the compartment interior.

Each tray shall be mounted on a pair of side mounted slides. The slide mechanisms shall have ball bearings for ease of operation and years of dependable service. The slides shall be mounted to shelf tracks to allow the tray to be adjustable up and down within the designated mounting location.

An automatic lock shall be provided for both the in and out tray positions. The lock trip mechanism shall be located at the front of the tray and shall be easily operated with a gloved hand.

The tray(s) shall be located 2 in compartment LS1, 2 in compartment LS3 under the adjustable shelf and 1 in in the bottom of compartment RS1.

**SLIDE-OUT/TILT-DOWN TRAY**

There shall be one (1) slide-out tray provided.
The bottom of each tray shall be constructed of 0.188" thick aluminum painted spatter gray while special aluminum extrusions shall be utilized for the tray sides, ends, and tracks. The corners shall be welded to form a rigid unit.

A spring-loaded lock shall be provided on each side at the front of the tray. Releasing the locks shall allow the tray to slide out approximately two-thirds (2/3) of its length from the stowed position and tip 30 degrees down from horizontal. The tray shall be equipped with ball bearing rollers for smooth operation.

Rubber padded stops shall be provided for the tray in the extended position.

The capacity rating of the tray shall be a minimum of 215 lb. in the extended position.

The vertical position of the tray within the compartment shall be adjustable.

The location(s) shall be in LS1 centered between the floor and ceiling.

**SLIDE-OUT FLOOR MOUNTED TRAY**
There shall be one (1) floor mounted slide-out tray(s) with 2.00" sides provided Compartment LS1. Each tray shall be rated for up to 500lb in the extended position. The tray(s) shall be constructed of .19" aluminum with non-welded corners. The finish shall be painted spatter gray.

The trays will be designed for maximum compartment width and depth.

There shall be two undermount-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 gloved hand.

**BACKBOARD STORAGE**
An aluminum trough for storage of one (1) backboard shall be mounted to the underside of the rear passenger side hatch compartment door. The backboard size shall be 19" wide x 79" long x 2" deep. Access to this storage area shall be from the forward edge of hatch compartment door.
**LITTLE GIANT LADDER STORAGE**
Storage shall be provided in the right-side forward jump compartment for a 17' Little Giant ladder. The ladder shall be horizontal on the floor. A shelf shall be provided directly above the ladder.

**DELETE STANDARD LOUVERS PER COMPARTMENT**
A total of seven (7) compartment louver(s) in compartment(s) all body compartments shall be deleted.

NFPA 1901, 2016 edition, section 15.1.1 requires any enclosed external compartment shall be weather resistant and ventilated and have provisions for drainage of moisture. Per fire department specification and request to have one (1) or more compartments provided without louvers, the apparatus shall be non-compliant to NFPA 1901 standards at time of contract execution.

**COMPARTMENT GRATING**
Vinyl grating shall be provided in 16 compartments. The locations are, LS1 floor, slide out trays and tilt tray. LS2 floor. LS3 floor, slide out trays and adj shelf. RS1 floor, slide out tray and adj shelves. RS2 floor and adj shelf and B1 floor.

The vinyl grating shall be .50" thick and be cross bonded by .25" diameter ribbed sections spaced for aeration.

**PEGBOARD**
There shall be 3/16" thick aluminum pegboard spatter gray painted installed on the back wall of three (3) compartments. It shall be mounted using two (2) horizontal tracks. Retainers shall be used to mount the pegboard to the tracks. The holes shall be .203" diameter, punched 1.00" on center. The pegboard shall be in the RS1, RS2 and RS3 and mounted on the water tank rear wall. The pegboard shall be spatter gray painted.

**RUB RAIL**
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, which allows 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.
**BODY FENDER CROWNS**
Polished stainless-steel fender crowns shall be provided around the rear wheel openings.

A fender liner constructed of painted body material 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.

**HARD SUCTION HOSE**
Hard suction hose shall not be required.

**HANDBRAILS**
The handrails shall be 1.25" diameter anodized aluminum extrusion, with a ribbed design, to provide a positive gripping surface.

Chrome plated end stanchions shall support the handrail. Plastic gaskets shall be used between end stanchions and any painted surfaces.

Drain holes shall be provided in the bottom of all vertically mounted handrails.

Handrails shall be located on the front of the body in positions needed to meet NFPA requirements.

- One (1) vertical handrail shall be located at the right rear to the side of the rear compartment.

One (1) horizontal black rubber-covered handrail shall be provided above the hose bed at the rear of the apparatus. The hose bed dividers shall be tied to the upper handrail or cross bar in order to provide enough reinforcement.

**CURVED HANDRAIL**
There shall be one (1) additional curved handrail(s) shall be provided. The curved handrail(s) shall be located on top of the hosebed cover in the driver side rear corner. Handrail to extend across the back 10.00" and curve extending forward along the hinge of the cover 19.00".

**AIR BOTTLE STORAGE (TRIPLE)**
A quantity of three (3) air bottle compartments designed to hold (3) air bottles up to 7.25" in diameter x 26.00" deep shall be provided on the driver side forward of the rear wheels, on the
passenger side forward of the rear wheels and on the passenger side rearward of the rear wheels. A polished stainless-steel door with a chrome plated flush lift & turn latch shall be provided to contain the air bottle. A dielectric barrier shall be provided between the door hinge, hinge fasteners and the body sheet metal.

Inside the compartment, black rubber matting and black Dura-Surf friction reducing material shall be provided.

**EXTINGUISHER STORAGE TROUGH**
A "V" shaped trough(s) shall be provided for storage of four (4) handheld fire extinguishers. The trough(s) shall be installed Troughs with straps to be shipped loose for customer to install. Front should be tipped up at least an inch to clear the flange on the horizontal partition over the little giant ladder. There is a picture of the trough in the job E folder for reference. The trough(s) shall be angled to slope towards the back of the compartment with a Velcro strap over the center to help provide secure storage. The trough(s) shall be formed out of aluminum and shall match the compartment finish. Dura-surf lining shall be provided on the bottom.

**EXTENSION LADDER**
There shall be a 24’ two-section aluminum Duo-Safety Series 900-A extension ladder provided.

**ROOF LADDER**
There shall be a 14’ aluminum Duo-Safety Series 775-A roof ladder provided.

**LADDER STORAGE**
The ladders shall be stored inside the upper section of the right-side compartments. This ladder rack shall reduce the depth of the upper section in the 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.

The ladders shall be banked in separate storage troughs.

The ladder storage assembly shall be fabricated of stainless-steel track channels to aid in loading and removal of ladders.

Rear of the ladder storage area shall have a vertically hinged smooth aluminum door with a D-handle latch to contain the ladders.

**FOLDING LADDER**
One (1) 10.00’ aluminum, Series 585-A, Duo-Safety folding ladder shall be installed in the pike pole/folding ladder compartment.

**PIKE POLE, 10 FOOT**
One (1) pike pole, 10-foot-long Nupla, with a fiberglass I-beam handle, shall be provided and located in the driver's side pike pole compartment, make all tubes in this compartment 12’ long.
PIKE POLE PROVIDED BY FIRE DEPARTMENT
NFPA 1901, 2016 edition, Section 5.9.4 requires one (1) 8 ft or longer pike pole mounted in a bracket fastened to the apparatus.

The pike pole is not on the apparatus as manufactured. The fire department shall provide and mount the pike pole.

The pike pole(s) shall be a Fire Hooks Unlimited 8-foot roof hook.

6’ PIKE POLE PROVIDED BY FIRE DEPARTMENT
NFPA 1901, 2016 edition, Section 5.9.4 requires one (1) 6’ pike pole or plaster hook mounted in a bracket fastened to the apparatus.

The pike pole is not on the apparatus as manufactured. The fire department shall provide and mount the pike pole.

The pike pole(s) shall be a Fire Hooks Unlimited 6-foot roof hook.

LONG ITEM STORAGE COMPARTMENT
One (1) compartment shall be provided, recessed in the upper, inside part of body compartment on the left side for storage of long handle tools. The door shall be made of smooth aluminum and have a lift and turn latch.

PIKE POLE/FOLDING LADDER COMPARTMENT
One (1) pike pole compartment shall be provided, recessed in the upper, inside part of body compartment on the right side. The compartment shall be equipped with two (2) aluminum tubes to hold two (2) pike poles and a stainless-steel trough for the folding ladder. The door shall be made of smooth aluminum and have a lift and turn latch.

PIKE POLE STORAGE
Aluminum tubing shall be used for the storage of three (3) pike poles and shall be in the driver side long tool storage compartment for three 12’ long Fire Hooks Unlimited Fiberglass pike poles with standard heads. If the head of a pike pole can come in contact with a painted surface, a stainless-steel scuff plate shall be provided.

SWIMMING POOL STYLE LADDER
A swimming pool style ladder shall be supplied for access to the hosebed on the driver’s side in place of the standard steps. The ladder shall be constructed of aggressive grip aluminum extrusion, with rubber-covered solid aluminum rungs. The rung spacing shall be approximately 14.00”. The outside rail shall curve up over the top of the body and extend forward to the hatch compartment door. The horizontal tie bars back to the body shall be attached to the ladder with “T” stanchions. The ladder shall be spaced 8.00” out from the body.
Specification for the Deerfield-Bannockburn Fire Department dated 10/22/19

**PUMP**
Pump shall be a low profile, 1250 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 ring design shall help 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 pump shall have a flat, patterned area on the top of the pump intake wye to allow standing for plumbing maintenance. 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. (no exception).

**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.

**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.

**PUMP GEAR CASE**

The pump gear case shall be a pressure-lubricated 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 to MIL Spec MIL-I-17563. A dipstick, accessible by tilting the cab, shall be provided for easy 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 always be live to allow for pump and roll applications. Rear engine power take-off's allow for high horsepower and torque ratings needed for large pump applications and is a proven drive system throughout the rugged construction industry (no exception).

**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. Clutch shall be of a time-tested design used in critical military applications (no exception).

**PUMPING MODE**

Pump shall provide for both pump and roll mode and stationary pumping mode.

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. If the vehicle is equipped with a foam system or CAFS system, these systems shall be engaged from the cab switch panel as well.

Pump and roll mode shall be accomplished using the main pump and shall not require the use of a secondary pump. Pump and roll mode shall use the same operation sequence as stationary pumping mode with a few additional steps. After the vehicle is setup for stationary pumping, the operator shall leave the cab and setup the pump panel to discharge at the desired outlet(s). Upon returning to the cab, the operator shall disengage the parking brake. An "OK to Pump & Roll" indicator shall illuminate on the cab switch panel. First gear on the transmission gear selector shall be selected by the operator for pump and roll operations. The operator as needed shall apply the foot throttle. Pump and roll mode shall be maintained unless the transmission shifts out of first gear.

Stopping either stationary pumping mode or pump and roll mode shall be accomplished by pressing the "Water Pump" switch down to disengage the pump.

**PUMP SHIFT**

Pump shall be engaged in not more than two steps, by simply 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, foam, or CAFS if equipped, and activate the appropriate system to preset parameters. The engagement shall provide simple two-step operation, enhance reliability, and eliminate gear clash. The shift shall include the indicator lights as mandated by NFPA. 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 available 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. To protect from accidental pump overheating, the pump shall automatically disengage when the truck transmission shifts into second gear.
TRANSMISSION LOCK UP
Transmission lock up is not required as transmission shall automatically shift to neutral as soon as the parking brake is set.

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.

INTAKE RELIEF VALVE - PUMP
There shall be One (1) Elkhart Style 40 relief valve(s) installed on the suction side of the pump preset at 125 psi.

The relief valve(s) shall have a working range of 75 psi to 250 psi.

The 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.

The relief valve pressure control shall be located behind the right-side pump panel with a stainless-steel access door.

PRESSURE CONTROLLER
A pressure governor shall be provided. 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 (within the discharge capabilities of the pump and water supply) 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 continuously monitors pump pressure sending a signal to the Electronic Control Module (ECM).

The governor can be 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 can 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 monitors the pump pressure and varies engine speed to maintain a precise pump pressure. The pressure controller shall use a quicker reacting J1939 database for engine control.

A preset feature allows a predetermined pressure or rpm to be set.
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 0.75” RPM display shall be provided to be visible at a glance.

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.

The pressure controller shall incorporate monitoring for engine temperature, oil pressure, fuel level alarm, and voltage. Pump monitoring shall include, pump gearcase 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.

A complete interactive manual shall be provided with the pressure controller.

**PRIMING PUMP**

Priming pump shall be a positive displacement vane type, electrically driven, and conforming to standards outlined in NFPA pamphlet #1901.

One (1) priming control shall open the priming valve and start the priming motor.

Primer shall be environmentally safe and self-lubricating.

**THERMAL RELIEF VALVE**

A thermal relief valve shall be included on the pump that monitors pump water temperature and opens to relieve water to cool the pump when the temperature of the pump water exceeds 120 Degrees F (49 C).

The thermal protection system shall include an amber warning light and audible alarm mounted on the pump operator panel.
The discharge line shall be 3/8-inch diameter tubing plumbed to ground near pump operator's panel.

**PUMP MANUALS**
There shall be a total of two (2) pump manuals provided by the pump manufacturer and furnished with the apparatus. The manuals shall be provided by the pump manufacturer in the form of two (2) electronic copies. Each manual shall cover pump operation, maintenance, and parts.

**PLUMBING, STAINLESS STEEL AND HOSE**
All inlet and outlet lines shall be plumbed with either stainless steel pipe, flexible polypropylene tubing or synthetic rubber hose reinforced with hi-tensile polyester braid. All hoses shall be equipped with brass or stainless-steel couplings. All stainless-steel hard plumbing shall be a minimum of a schedule 10 wall thickness.

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 cast iron or stainless steel.

All piping lines are to be drained through a master drain valve or shall be equipped with individual drain valves. All drain lines shall be extended with a hose to drain below the chassis frame.

All water carrying gauge lines shall be of flexible polypropylene tubing.

All piping, hose and fittings shall have a minimum of a 500 PSI hydrodynamic pressure rating.

**FOAM SYSTEM PLUMBING**
All piping that is in contact with the foam concentrate or foam/water solution shall be stainless steel. The fittings shall be stainless steel or brass. Cast iron pump manifolds will be allowed.

**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.

**MAIN PUMP INLET CAP**
The main pump inlets shall have National Standard Threads with a long handle chrome cap.

The cap shall incorporate a thread design to automatically relieve stored pressure in the line when disconnected (no exception).
VALVES
All ball valves shall be Akron® Brass in-line valves. The Akron valves shall be the 8000 series heavy-duty style with a stainless-steel ball and a simple two-seat design. No lubrication or regular maintenance is required on the valve.

Valves shall have a ten (10) year warranty.

LEFT SIDE INLET
There shall be one (1) auxiliary inlet with a 3.00" valve at the left side pump panel, terminating with a 2.50" (F) National Standard hose thread adapter.

The auxiliary inlet shall be provided with a strainer, chrome swivel and plug.

RIGHT SIDE INLET
There shall be one (1) auxiliary inlet with a 3.00" valve at the right-side pump panel, terminating with a 2.50" (F) National Standard hose thread adapter.

The auxiliary inlet shall be provided with a strainer, chrome swivel and plug.

The location of the valve for the two (2) inlets shall be recessed behind the pump panel.

ANODE, INLET
A pair of sacrificial zinc anodes shall be provided in the water pump inlets to protect the pump from corrosion.

INLET CONTROL
The side auxiliary inlet(s) shall incorporate a quarter-turn ball valve with the control located at the inlet valve. The valve operating mechanism shall indicate the position of the valve.

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 provides excellent leverage. The water discharged by the bleeders shall be routed below the chassis frame rails.

TANK TO PUMP
The booster tank shall be connected to the intake side of the pump with heavy duty 4.00" piping and a quarter turn 3.00" full flow line valve with the control located at the operator's panel. A rubber coupling shall be included in this line to prevent damage from vibration or chassis flexing.

A check valve shall be provided in the tank to pump supply line to prevent the possibility of "back filling" the water tank.
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.

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" (M) 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.

RIGHT SIDE DISCHARGE OUTLETS
There shall be two (2) discharges with a 2.50" valve on the right side of the apparatus, terminating with 2.50" MNST adapters. The discharges shall be located below the crew cab and shall be no higher than the top of the chassis frame rail.

There shall be Akron 9335 electric valve controllers provided on the pump operators panel. The electric controls must be of a true position feedback design, requiring no clutches in the motor or current limiting. The units must be completely sealed with momentary open, close as well and an optional one touch full open feature to operate the valve actuator. The controllers shall provide position indication on a full color, backlit LCD display. They shall have manual adjustment of the brightness as well as an auto dimming option.

In addition to valve position, each controller shall include a pressure display.

FRONT DISCHARGE OUTLET
There shall be one (1) 1.50" discharge outlet piped to the front of the apparatus and located on the top of the right side of the front bumper.

Plumbing shall consist of 2.00" piping and flexible hose with a 2.00" ball valve with control at the pump operator's panel. A fabricated weldment made of stainless-steel pipe shall be used in the plumbing where appropriate. The piping shall terminate with a 1.50" NST with 90-degree stainless steel swivel.

There shall be automatic drains provided at all low points of the piping.

REAR DISCHARGE OUTLET
There shall be one (1) discharge piped to the rear of the hose bed, on right side, installed so proper clearance is provided for spanner wrenches or adapters. Plumbing shall consist of 2.50" piping along with a 2.50" full flow ball valve with the 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 below the water tank.
REAR DISCHARGE OUTLET
There shall be a 4.00" diameter discharge piped to the rear of the apparatus. The plumbing shall consist of 4.00" stainless steel piping along with a 4.00" valve with a handwheel, controlled from the pump operator’s panel.

The plumbing shall be routed to the rear below the water tank and between the frame rails (no exception). The outlet shall terminate along the left side at the rear at tailboard height.

The piping shall contain only large radius elbows, no mitered joints.

A rocker lug cap shall be provided.

DISCHARGE CAPS/INLET PLUGS
Chrome plated, rocker lug, caps with chain shall be furnished for all discharge outlets 1.00" thru 3.00" in size, besides the pre-connected hose outlets.

Chrome plated, rocker lug, plugs with chain shall be furnished for all auxiliary inlets 1.00" thru 3.00" in size.

The caps and plugs shall incorporate a thread design to automatically relieve stored pressure in the line when disconnected (no exception).

OUTLET BLEEDER VALVE
A 0.75" bleeder valve shall be provided for each outlet 1.50" or larger. Automatic drain valves are acceptable with some outlets 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.

REAR OUTLET ELBOWS
The 2.50" discharge outlets located at the rear of the apparatus shall be furnished with a 2.50" (F) National Standard hose thread x 2.50" (M) National Standard hose thread, chrome plated, 45-degree elbow.

The elbow shall incorporate a thread design to automatically relieve stored pressure in the line when disconnected (no exception).

REDUCER
There shall be two (2) adapters with 2.50" FNST x 1.50" MNST threads and a 1.50" chrome plated cap installed on one driver and one passenger side 2.50" outlet.
**DISCHARGE OUTLET CONTROLS**
The discharge outlets 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.

The passenger side discharges shall be controlled by an Akron 9335 Navigator Pro electric valve controllers with the manual override located on the passenger side pump panel. 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, each controller shall include a pressure display.

All other outlets shall have manual swing handles that operate in a vertical up and down motion. The handles shall close the valve in the down position and open the valve in the upward position. These handles shall be able to lock in place to prevent valve creep under pressure.

**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. 3.00" piping shall be installed securely so no movement develops when the line is charged. The riser shall be gated and controlled at the pump operator's panel with a handwheel control. A 2.50" valve shall be provided.

**TELESCOPIC PIPING**
The deluge riser piping shall include a 18.00" Task Force Model XG18 Extend-A-Gun extension. This extension shall be telescopic to allow the deluge gun to be raised 18.00" increasing the range of operation.

A triangular bracing structure shall be installed to support the piping. Aluminum tread plate shall be placed on the forward side of the bracing structure.

A position sensor shall be provided on the telescopic piping that shall activate the "do not move vehicle" light inside the cab when the monitor is in the raised position.

**MONITOR**
A Task Force Tips Crossfire #XFT-NJ monitor shall be properly installed on the deluge riser. This monitor shall be painted as provided by monitor manufacturer.

**NOZZLE, DELUGE**
Task Force Tips Model MST-4NJ quad stacked tips and a TFT XF-SS5 stream shaper shall be provided.

The deluge riser Extend-a-Gun shall have provisions for direct mounting a Task Force Tips Crossfire monitor.
CROSSLAY MODULE
The crosslay module shall be full width of the rear body.

The forward, upper corners of the module shall have full body corners.

The crosslay module shall be manufactured for installation of roll up doors on each side.

ROLLUP DOOR, CROSSLAY ENDS
The compartment doors shall be rollup style, double faced aluminum construction painted one (1) color to match the lower portion of the body and manufactured by R-O-M Corporation.

The slats shall be double wall box frame extrusion. The exterior surface shall be flat, and the interior surface shall be concave to help loose equipment fall to the ground and prevent it from jamming the door.

Between each slat shall be a PVC inner seal to prevent metal to metal contact and prevent dirt or moisture from entering the compartments.

A non-locking lift bar to be provided for each roll-up door. The lift bar shall be located at the bottom of the door and have latches on the outer extrusion of the door frame. A ledge shall be supplied over the lift bar as additional area to aid in closing the door.

Each door shall have a 4.00" counterbalance to assist in lifting.

A heavy-duty magnetic switch shall be used for the control of open compartment door warning lights.

The crosslays shall have a drip pan below the roll of the door.

CROSSLAY COMPARTMENT LIGHTING
There shall be two (2) 12-volt DC light strips with white LEDs and mechanical fasteners, provide behind the front door frame on the crosslay compartments per the following:

- One (1) strip light for the left side crosslay compartment door
- One (1) strip light for the right side crosslay compartment door

The lights shall be activated when the battery switch is on and the respective door is opened.

CROSSLAY(S), LOWER
There shall be two (2) lower crosslays provided.

1.50" Crosslays
There shall be two (2) 1.50" crosslays plumbed with 2.00" welded or formed schedule 10 304L stainless steel pipe.

The crosslays shall be low mounted with the bottom of both crosslay trays no more than 11.00" above the frame rails for simple, safe reloading and deployment.
There shall be a 1.50" National Standard hose thread 90-degree swivel provided in each hose bed, so that the hose may be removed from either side of apparatus. The swivel shall be as far outbound as possible for ease of changing hose.

Each crosslay shall be gated with a 2.00" quarter turn ball valve with the controls located at the pump operator’s panel.

Each hose bed shall be capable of carrying 200’ of 1.75” double jacket hose.

**Crosslay Hose Trays**

A removable tray shall be provided for each crosslay hose bed. The crosslay tray shall 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 from the compartment. The floor of the trays shall be perforated to allow for drainage and hose drying.

Trays shall be held in place by a mechanical spring-loaded stainless-steel latch that automatically deploys upon loading the trays to hold the trays in place during transit.

**CROSSLAY(S), UPPER**

There shall be one (1) upper crosslay provided.

**2.50" Crosslay**

There shall be one (1) 2.50" crosslay deadload, with no plumbing. The hose bed shall be capable of carrying 200’ of 2.50” double jacket hose.

**Crosslay Hose Trays**

A removable tray shall be provided for each crosslay hose bed. The crosslay tray shall 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 from the compartment. The floor of the trays shall be perforated to allow for drainage and hose drying.

Trays shall be held in place by a mechanical spring-loaded stainless-steel latch that automatically deploys upon loading the trays to hold the trays in place during transit.

**FOAM PROPORTIONER**

A foam proportioning system shall be provided that is an on demand, automatic proportioning, single point, direct injection system suitable for all types of Class A and B foam concentrates, including the high viscosity (6000 cps.), alcohol resistant Class B foams. Operation shall be based on direct measurement of water flow and remain consistent within the specified flows and pressures. The system shall automatically balance and proportion foam solution at rates from .1 percent to 9.9 percent regardless of variations in water pressure and flow, up to the maximum rated capacity of the foam concentrate pump.
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The design of the system shall allow operation from draft, hydrant, or relay operation. This shall provide a versatile system to meet the demands at a fire scene.

**SYSTEM CAPACITY**
The system shall have the ability to deliver the following minimum foam solution flow rates that meet or exceed NFPA requirements at a pump rating of 250 psi.

- 200 gpm @ 6 percent
- 400 gpm @ 3 percent
- 1200 gpm @ 1 percent

The foam concentrate setting may be adjusted in .1 percent increments from .1 percent to 9.9 percent. Typical settings are .3 percent, .5 percent and 1.0 percent. (The maximum capacity shall be limited to the plumbing and water pump capacity).

**CONTROL SYSTEM**
The system shall be equipped with a digital electronic control display located on the pump operators' panel. Push button controls shall be integrated into the panel to turn the system on/off, control the foam percentage, direct which foam to use on a multi-tank system, and to set the operation modes (automatic, manual, draft, calibration, or flush).

The percent of injection shall have presets for Class A or Class B foam. These presets can be changed at the fire department as desired. The percent of injection shall be able to be easily changed at the scene to adjust to changing demands.

In order to minimize the use of abbreviations and interpretations, system information shall be displayed on the panel by way of .50 tall LEDs that total 14 characters (two (2) lines of seven (7) each). System on and foam pump on indicator lights shall also be included. Information displayed shall include mode of operation (automatic, manual, draft, calibration, or flush), foam supply selected (Class A or Class B), water total, foam total, foam percentage, remaining gallons, and time remaining.

The control display shall direct a microprocessor, which receives input from the systems water flow meter while also monitoring the position of the foam concentrate pump. The microprocessor shall compare the values of the water flow versus the position/rate of the foam pump, to ensure the proportion rate is accurate. One (1) check valve shall be installed in the plumbing to prevent foam from contaminating the water pump.

**LOW LEVEL, FOAM TANK**
The control head shall display a warning message when the foam tank in use is below a quarter tank.
**HYDRAULIC DRIVE SYSTEM**

The foam concentrate pump shall be powered by a hydraulic drive system, which is automatically activated, whenever the vehicle water pump is engaged. A system that drives the foam pump via an electric motor shall not be acceptable. A large parasitic electric load used to power the foam pump can cause an overload of the chassis electrical system.

Hydraulic oil cooler shall be provided to automatically prevent overheating of the hydraulic oil, which is detrimental to system components. The oil/water cooler shall be designed to allow continuous system operation without allowing hydraulic oil temperature to exceed the oil specifications.

The hydraulic oil reservoir shall be of four (4) gallons minimum capacity and shall also be of enough size to minimize foaming and be located to facilitate checking oil level or adding oil without spillage or the need to remove access panels.

**FOAM CONCENTRATE PUMP**

The foam concentrate pump shall be of positive displacement, self-priming; linear actuated design, driven by the hydraulic motor. The pump shall be constructed of brass body; chrome plated stainless steel shaft, with a stainless-steel piston. In order to increase longevity of the pump, no aluminum shall be present in its construction.

A relief system shall be provided which is designed to protect the drive system components and prevent over pressuring the foam concentrate pump.

The foam concentrate pump shall have minimum capacity for 12 gpm with all types of foam concentrates with a viscosity at or below 6000 cps including protein, fluoroprotein, AFFF, FFFP, or AR-AFFF. The system shall deliver only the amount of foam concentrate flow required, without recirculating foam back to the storage tank. Recirculating foam concentrate back to the storage tank can cause agitation and premature foaming of the concentrate, which can result in system failure. The foam concentrate pump shall be self-priming and can draw foam concentrate from external supplies such as drums or pails.

**EXTERNAL FOAM CONCENTRATE CONNECTION**

An external foam pick-up shall be provided to enable use of a foam agent that is not stored on the vehicle. The external foam pick-up shall be designed to allow continued operation after the on-board foam tank is empty. The external foam pick-up shall be designed to allow use with training foam or colored water for training purposes.

**PANEL MOUNTED STRAINER/EXTERNAL PICK-UP CONNECTION**

A bronze body strainer/connector unit shall be provided. The unit shall be mounted to the pump panel. The external foam pick-up shall be one (1) 1.00" male connection with chrome-plated cap integrated to a 2.00" strainer cleanout cap. A check valve shall be installed in the pick-up portion of the cleanout cap. A basket style stainless steel screen shall be installed in the body of the strainer/connector unit. Removal of the 2.00" cleanout cap shall be all that is required to
gain access to and remove the stainless-steel basket screen. The strainer/connector unit shall be ahead of the foam concentrate pump inlet port to ensure that all agent reaching the foam pump has been strained.

**PICK-UP HOSE**
A 1.00” flexible hose with an end for insertion into foam containers shall be provided. The hose shall be supplied with a 1.00” female swivel NST thread swivel connector. The hose shall be shipped loose.

**DISCHARGES**
The foam system shall be plumbed to the lower rear crosslay, lower front crosslay, right side of front bumper and right rear outlet.

**SYSTEM ELECTRICAL LOAD**
The foam proportioning shall not impose an electrical load on the vehicle electrical system any greater than five (5) amps at 12VDC.

**FOAM SUPPLY VALVE**
An electric valve shall be used for the foam supply valve. The foam supply valve shall be controlled at the foam system control head for ease of operation. The supply valve shall be electric, remote controlled, to eliminate air pockets in the foam tank supply hose.

**MAINTENANCE MESSAGE**
A message shall be displayed on the control head to advise when system maintenance needs to be performed. The message shall display interval for cleaning the foam strainer, cleaning for the water strainers, and changing the hydraulic oil.

**FLUSH SYSTEM**
The system shall be designed such that a flush mode shall be provided to allow the system to flush all foam concentrate with clear water. The flush circuit control logic shall ensure the foam tank supply valve is closed prior to opening the flush valve. The flush valve shall be operated at the foam system control head for ease of operation. The valve shall be electrically controlled and located as close to the foam tank supply valve as possible. A manual flush drain valve shall be labeled and conveniently located.

**SINGLE FOAM TANK REFILL**
The foam system's proportioning pump shall be used to fill the Class A foam tank. This shall allow use of the auxiliary foam pick-up to pump the foam from pails or a drum on the ground into the foam tank. A foam shut-off switch shall be installed in the fill dome of the tank to shut the system down when the tank is full. The fill operation shall be controlled by a mode in the foam system controller stating TANK FILL. While the proportioner pump is filling the tank, the controller shall display FILL TANK. When the tank is full, as determined by the float switch in the tank dome, the pump shall stop, and the controller shall display TANK FULL.
The fire department shall order the fire apparatus with a foam system. A demonstration shall be provided at the manufacturer, on the operation of the foam system.

This demonstration shall include:

- A hands on foam system start-up and discharge session.

- The demonstration shall be done with foam to simulate real conditions.

**FOAM TANK**
The foam tank shall be an integral portion of the polypropylene water tank. The cell shall have a capacity of 20 gallons of foam with the intended use of Class A foam. The brand of foam stored in this tank shall be Chem-Guard. The foam cell shall not reduce the capacity of the water tank. The foam cell shall have a screen in the fill dome and a breather in the lid.

**FOAM TANK DRAIN**
A system of 1.00” foam tank drains shall be provided, integrated into the foam systems strainer and tank to foam pump valve management system. The tank to pump hoses running from the tank(s) to the panel mounted strainer shall 1.00” diameter. The foam system controller shall have a mode that allows for a given foam valve to be opened at will. Flow of foam from the tank valve to the strainer shall be usable as a tank drain mode.

An adaptor shall be supplied, that allows the 1.00” foam intake screen to assembly to be used as a drain outlet. The standard supplied 1.00” foam pick up hose shall be attached to the screen assembly by way of the adapter. The drain mode shall allow the operator to open and close the tank valve as required from the control head, to drain foam and re-fill foam containers through the connected hose, without foam spillage beneath the vehicle.

**PUMP CONTROL PANELS (LEFT SIDE CONTROL)**
Pump controls and gauges shall be located midship at the left 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 left side discharges shall be controlled directly at the valve. There shall be no push-pull style control handles. (no exception)

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.

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 at the front of the body, ahead of the water tank above the plumbing.

**PUMP PANEL CONFIGURATION**

The pump panel configuration shall be arranged and installed in an organized manner that shall provide user-friendly operation.

**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.

**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
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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.

**PUMP COMPARTMENT LIGHTING**
There shall be two (2) Truck-Lite, Model 44308C 4.00” white LED light(s) with Model 40700 grommet provided inside the pump enclosure for pump compartment lighting.

The light(s) shall be controlled by a switch located each light.

Engine monitoring graduated LED indicators shall be incorporated with the pressure controller.

**INDICATOR LIGHTS @ PUMP PANEL**
The following indicator lights shall be provided at the pump panel. These shall be in addition to the indicators included with the pressure controller.

- Check Transmission Warning Indicator Light
- Stop Engine Warning Indicator Light
- Check Engine Warning Indicator Light.

**AIR HORN BUTTON**
An air horn control button shall be provided at the pump operator's control panel. This button shall be red in color and properly labeled "Evacuation".

**ALUMINUM HEAT ENCLOSURE**
A heat enclosure shall be installed. The forward section of the enclosure shall consist of an aluminum understructure, with easily removable aluminum panels.

The rearward section shall consist of a pan below the exhaust and a covering above the plumbing so warm air cannot escape freely.

**COLOR CODED NAME TAGS**
There shall be six (6) outlet discharges with special color-coded name tags. These tags shall be used for labeling the discharge pressure gauges, controls, outlets and drains. Nametags and colors to be determined during print review.

**VACUUM AND PRESSURE GAUGES**
The pump vacuum and pressure gauges shall be liquid filled and manufactured by Class 1 Incorporated ©.

The gauges shall be a minimum of 6.00" in diameter and shall have white faces with black markings, with a pressure range of 30.00" 0-400 psi.
The pump pressure and vacuum gauges shall be installed adjacent to each other at the pump operator's control panel.

Test port connections shall be provided at the pump operator's panel. One (1) 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 polished stainless-steel plugs. They shall be marked with a label.

**PRESSURE GAUGES**

The individual "line" pressure gauges for the discharges shall be interlube filled and manufactured by Class 1©.

The gauges shall be a minimum of 3.00" in diameter and shall have white faces with black lettering.

Gauge construction shall include a Zytel nylon case with adhesive mounting gasket and threaded retaining nut.

Gauges shall have a pressure range of 30"-0-400#.

The individual pressure gauge shall be installed as close to the outlet control as practical.

This gauge shall include a 10-year warranty against leakage, pointer defect, and defective bourdon tube.

**WATER LEVEL GAUGE**

An electric water level gauge shall be incorporated in the pressure controller that registers water level by means of nine (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 percent. The gauge 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.

**MINI SLAVE UNIT**

An electric water level gauge shall be provided in the cab that registers water level by means of five (5) LEDs. They shall be at 1/4 level increments with a tank empty LED. The LEDs shall be a bright type that are readable in sunlight and have a full 180-degree of clear viewing.

The water level gauge in the cab shall be activated when the pump is in gear.
### FOAM LEVEL GAUGE
An electric foam level gauge shall be provided on the operator's panel, that registers foam level by means of nine (9) LEDs. There shall also be a mini foam level gauge with five (5) LEDs in the cab. 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. The gauge shall match the water level gauge in the pressure controller.

To further alert the pump operator, shall have a warning flash when the tank volume is less than 25 percent, 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. This method provides accuracy with an array of multi-viscosity foams.

The foam level gauge in the cab shall be activated by pump is in gear.

### 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 four (4) footlamberts.

The pump panels shall be illuminated by four (4) Truck-Lite, Model 6060C white LED lights installed on the back of the cab, two (2) on the driver's side and two (2) on the passenger's side.

The pump operator's panel shall utilize the same LED strip lighting at the forward doorframe as all other compartment lighting.

There shall be a small white LED pump engaged indicator light installed overhead.

### AIR HORN SYSTEM
There shall be two (2) Grover air horns recessed in the front bumper. 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.

**Air Horn Location**
The air horns shall be located on each side of the bumper, inside of the frame rails.

**AIR HORN CONTROL**
The air horns shall be actuated per the following:

- a foot switch located on the driver's side interlocked to the emergency master switch.
- a foot switch located on the passenger's side interlocked to the emergency master switch.
- a lanyard chain with plastic tube covering located within reach of the passenger.
• the horn button in the steering wheel. The driver shall have the option to control the air horns or the chassis horns from the horn button by means of a selector switch located on the instrument panel.

**ELECTRONIC SIREN**
A Federal, model 690010, PA300-012MSC, electronic siren with noise canceling microphone shall be provided.

This siren to be active when the battery switch is on and that emergency master switch is on. Siren head shall be centered on the underside of the forward overhead panel facing rearward. The electronic siren shall be controlled on the siren head only. No horn button or foot switches shall be required.

**SPEAKERS**
There shall be two (2) Federal Signal DynaMax®, Model ES100, 100-watt speakers provided. The speakers shall use a Federal Signal, Model ESFMT-EF, recess mount with stainless steel grille. Each speaker shall be connected to the siren amplifier.

The speakers shall be recessed in each side of the front bumper, inside of the frame rails.

**AUXILIARY MECHANICAL SIREN**
A Federal Q2B® siren shall be furnished. A siren brake button shall be installed on the 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 in the center. The siren shall be supported by the bumper framework.

The mechanical siren shall be actuated by two (2) foot switches, one (1) located on the officer's side and one (1) on the driver's side.

**BRACKET, FOOT SWITCHES**
A wedge style bracket shall be provided on the officer's side of cab floor. The bracket shall be large enough to hold two (2) foot switches.

A second siren brake switch shall be installed on the passenger side.

**CAB ROOF LIGHTBAR**
There shall be one (1) 91.00" Code 3®, Model 2791A, LED lightbar mounted on the cab roof.

The lightbar shall include the following:

- One (1) red flashing LED module in the driver's side rear corner position.
- One (1) red flashing LED module in the driver's side front corner position.
• One (1) blue flashing LED module in the driver's side first front position.
• One (1) white flashing LED module in the driver's side second front position.
• One (1) red flashing LED module in the driver's side third front position.
• One (1) E795LP LED traffic light controller set to national standard high priority. The individual switch for the E795 LP LED traffic light shall function independently or with the emergency master switch.
• One (1) red flashing LED module in the passenger's side third front position.
• One (1) white flashing LED module in the passenger's side second front position.
• One (1) blue flashing LED module in the passenger's side first front position.
• One (1) red flashing LED module in the passenger's side front corner position.
• One (1) red flashing LED module in the passenger's side rear corner position.

The lightbar shall be provided with clear lenses.

This lightbar shall be controlled by a switch in the cab on the switch panel.

The traffic light controller shall be controlled by a cab switch with emergency master control.

There shall be a driver side momentary cab switch with no emergency master control.

The white LED’s and the traffic light controller shall be disabled when the parking brake is applied.

**CAB FACE WARNING LIGHTS**
There shall be four (4) Whelen®, Model M6**, 4.31” high x 6.75” long x 1.37” deep flashing LED warning lights installed on the cab face, above the headlights, mounted in a common bezel.

• The driver’s side front outside warning light to be red. The flash pattern of this light shall be set to pattern number 96 ComAlert™ 150.
• The driver's side front inside warning light to be blue. The flash pattern of this light shall be set to pattern number 110 Action Flash™ 150.
• The passenger’s side front inside light to be green. The flash pattern of this light shall be set to pattern number 110 Action Flash 150.
• The passenger's side front outside warning light to be red. The flash pattern of this light shall be set to pattern number 96 ComAlert 150.

The lights shall include the same color as the LED’s.

There shall be a switch in the cab on the switch panel to control the lights.

The inside lights may be load managed if colored or disabled if white, when the parking brake is applied.
SIDE ZONE LOWER LIGHTING
There shall be four (4) Whelen®, flashing LED warning lights with chrome trim installed per the following:

- Two (2) Model 90**5F*R, 7.12" high x 9.12" long x 1.37" deep lights, one (1) each side on the bumper extension. The left side, side front light to include red warning LEDs and the right side, side front light to include red warning LEDs.
- Two (2) Model 60*02F*R, 4.18" high x 6.56" long x 1.43" deep, one (1) each side on the rear fender panel. The left side, side rear light to include red warning LEDs and the right side, side rear light to include red warning LEDs.
- The warning light lens color(s) to be clear.

There shall be a switch in the cab on the switch panel to control the lights.

INTERIOR CAB DOOR WARNING LIGHTS
There shall be four (4) Whelen®, Model 0S*00FCR, amber LED flashing lights provided, one (1) light located inside of each cab and crew cab door panel, as far to the outside as practical. Each light shall be activated by the door jamb switch of the associated door. The lights shall flash whenever the corresponding door is open.

SIDE WARNING LIGHTS
There shall be four (4) Whelen, Model M9*C LED flashing warning light(s) with bezel(s) provided in the front and rear upper corners of the hatch compartments.

The color of the lights shall be red.

All these lights shall include a clear lens.

These lights shall be activated with the Side Zone Lower warning lights.

SIDE WARNING LIGHTS
There shall be two (2) Whelen, Model M6*C LED flashing warning light(s) with bezel(s) provided Behind the crew cab doors.

The color of the lights shall be blue.

All these lights shall include a clear lens.

These lights shall be activated with the Side Zone Lower warning lights.

REAR ZONE LOWER LIGHTING
There shall be two (2) Whelen®, Model M6*C LED flashing warning lights with chrome trim located at the rear of the apparatus.

- The driver's side rear light to be red
- The passenger's side rear light to be red
The lenses shall be clear.

There shall be a switch located in the cab on the switch panel to control the lights.

**REAR WARNING LIGHTS**
There shall be two (2) Whelen®, Model M9*C, LED flashing warning light(s) with bezel(s) provided each side high on rear compartment bulkheads.

The color of these light(s) shall be amber.

These light(s) shall be controlled with a separate switch in cab.

These light(s) shall include a lens that is clear.

**REAR OF HOSEBED WARNING LIGHTS**
There shall be a pair of Code 3®, Model DB2-2PZNFPA-RB1, LED beacons provided at the rear of the truck located, one (1) each side.

Both beacons shall include two (2) PriZm II, LED modules and clear lenses.

- The side facing PriZm II, LED modules to be blue
- The rear facing PriZm II, LED modules to be red

There shall be a switch located in the cab on the switch panel to control the beacons.

The rear warning lights shall be mounted on top of the compartmentation with all wiring totally enclosed. The rear deck lights shall be mounted on the beavertails as high as possible.

**TRAFFIC DIRECTING LIGHT**
There shall be one (1) Whelen®, Model TAL65, 36.00" long x 2.87" high x 2.25" deep, amber LED traffic directing light installed at the rear of the apparatus.

The Whelen, Model TACTL5, control head shall be included with this installation.

The controller shall be energized when the battery switch is on.

The auxiliary flash not activated.

This traffic directing light shall be mounted over the hosebed, between the body side sheets, on a cross tube at the rear of the apparatus.

This installation shall include a treadplate box.

The traffic directing light controller shall be located within the switch panel on the center console. The controller shall be within easy reach of the driver.

**ELECTRICAL SYSTEM GENERAL DESIGN FOR ALTERNATING CURRENT**
The following guidelines shall apply to the 120/240 VAC system installation:
Specification for the Deerfield-Bannockburn Fire Department dated 10/22/19

**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, 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.

**Grounding**
Grounding shall be in accordance with Section 250-6 "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.

An equipment grounding means shall be provided in accordance with Section 250-91 (Grounding Conductor Material) 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 Section 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 Section 310-15 (amp capacities) 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.

**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 following information:

- Rated voltage(s) and type (ac or dc)
- Phase
- Rated frequency
- Rated amperage
- Continuous rated watts
- Power source engine speed

Direct drive (PTO) and portable generator installations shall comply with Article 445 (Generators) of the NEC.

**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” (3658 mm) 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).

**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" (305 mm), or properly shielded, from exhaust piping
- Separated from fuel lines by a minimum of 6.00" (152 mm) distance

Electrical cord or conduit shall be supported within 6.00" (152 mm) of any junction box and at a minimum of every 24.00" (610 mm) 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.

**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.

**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 Section 210-7 “Receptacles and Cord Connections” of the NEC.

All receptacles located in a wet location shall be not less than 24.00" (610 mm) from the ground. Receptacles on off-road vehicles shall be a minimum of 30.00" (762 mm) 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.

**Dry Locations**
All receptacles located in a dry location shall be of the grounding type. Receptacles shall be not less than 30.00" (762 mm) 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.

**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.

**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.
Operational Test per Current NFPA 1901 Standard

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 prime mover 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 the current NFPA 1901 standard.

Where the line voltage power is derived from the vehicle’s low voltage system, the minimum continuous electrical load as defined in the current NFPA 1901 standard shall be applied to the low voltage electrical system during the operational test.

GENERATOR

There shall be one (1) Harrison 3.6 kW hydraulic generator provided.

This generator shall be 31.00" long x 15.00" wide x 14.13" high and weigh 168 lbs.

This generator shall have a 3,600-watt continuous duty rating @ 120 volts AC.

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).

The generator hydraulic circuit shall include a soft start valve to protect the generator components during PTO engagement.

There shall be an AC voltmeter furnished next to the circuit breaker panel to monitor the generator.

GENERATOR LOCATION

The generator shall be mounted in the hose bed area on the water tank over water tank.

GENERATOR START

There shall be a switch provided on the cab instrument panel to engage the generator.

GENERATOR REMOTE START

There shall be one (1) remote start switch provided in the cab switch panel and on the pump panel to engage the hydraulic generator PTO and field. A light at each switch location shall be provided to indicate that the generator is running.
CIRCUIT BREAKER PANEL
The smallest size practical circuit breaker panel shall be located recessed mounted in compartment LS3, 34" from the floor to the bottom of the breaker box.

LIGHT TOWER
There shall be one (1) Will-Burt, Model NS2.3-600 WHL, light tower provided.

There shall be four (4) Whelen, Model PFH2, 150-watt 12-volt LED DC light heads included on this tower.

The painted parts of the light tower and the light heads to be white.

This tower shall be connected to the Do Not Move Truck Indicator in the cab.

The lights included on this tower may be load managed when the parking brake is applied.

LIGHT TOWER LOCATION
The light tower shall be installed on the crew cab roof.

LIGHT TOWER CONTROLLER
There shall be one (1) handheld wired controller included.

LOCATION FOR THE LIGHT TOWER CONTROLLER
The light tower controller shall be installed in the driver’s side front body compartment.

ELECTRIC CORD REEL
Furnished with the 120-volt AC electrical system shall be a Hannay, Series 1600, cord reel. The reel shall be provided with a 12-volt electric rewind switch that is guarded to prevent accidental operation and labeled for its intended use. The switch shall be protected with a fuse and installed at a height not to exceed 72.00" above the operators standing position.

The exterior finish of the reel(s) shall be painted #269 gray from the reel manufacturer.

No guide is required on the reel assembly. A ball stop shall be provided to prevent the cord from being wound on the reel.

A label shall be provided in a readily visible location adjacent to the reel. The label shall indicate current rating, current type, phase, voltage and total cable length.

A total of one (1) cord reel shall be provided one (1) over compartment D3 in the hatch compartment.

The cord reel should be configured with three (3) conductors.
CORD
Provided for electric distribution shall be one (1) length installed on the reel of 200 feet of yellow 10/3 electrical cord, weather resistant 105 degree Celsius to -50 degree Celsius, 600-volt jacketed SOOW cord. No connector shall be installed on the end of the cord.

PORTABLE JUNCTION BOX
There shall be a total of one (1) electrical junction box(es), listed for use in wet locations and provided with light to indicate power on. Each box shall be designed to keep the exterior electrical components above 2.00” of standing water, protected from corrosion, and capable of being carried with a gloved hand.

There shall be a cable strain relief and direct connection, no plug provided for each box. Each box shall be yellow powder coated. There shall be two circuits, 4 wire, with a common trip provided to each box.

Each Circle D, PF51G Series, box shall be provided with the following receptacles:

- Four (4) 120 vac, 20-amp twist lock receptacles

ROLLER GUIDE
A captive roller assembly shall be installed in a body sheet to aid in the payout of the cord from a reel mounted in a compartment. There shall be one (1) for each reel for a total one (1) roller guide.

The roller guide will be in the ceiling of compartment D3 below the electric cord reel.

VELCRO STRAP
There shall be a Velcro® strap, with footman loops, installed on the junction box holder. A total of one (1) shall be installed.

JUNCTION BOX HOLDER
There shall be an aluminum junction box holder installed adjacent to the cord reel. A total of one (1) shall be mounted at pick-up.

120 VOLT RECEPTACLES
There shall be five (5), 15/20-amp 120-volt AC three (3) wire straight blade duplex receptacle(s) with interior stainless-steel wall plate(s), installed Three on the back wall of the EMS compt,1 high, 1 in the middle and 1 low. The 4th one in compartment RS1 recessed into the wheel well just below the transition near the water tank wall and the 5th one goes behind the driver seat. The NEMA configuration for the receptacle(s) shall be 5-20R.

The receptacle(s) shall be powered from the shoreline inlet.

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

- Line Voltage
• Current Rating (amps)
• Phase
• Frequency
• Power Source

**NFPA REQUIRED LOOSE EQUIPMENT PROVIDED BY FIRE DEPARTMENT**

The following loose equipment as outlined in NFPA 1901, 2016 edition, section 5.9.3 and 5.9.4 shall be provided by the fire department.

- 800 ft (60 m) of 2.50” (65 mm) or larger fire hose.
- 400 ft (120 m) of 1.50” (38 mm), 1.75” (45 mm), or 2.00” (52 mm) fire hose.
- One (1) handline nozzle, 200 gpm (750 L/min) minimum.
- Two (2) handline nozzles, 95 gpm (360 L/min) minimum.
- One (1) smoothbore of combination nozzle with 2.50” shutoff that flows a minimum of 250 gpm.
- One (1) SCBA complying with NFPA 1981 for each assigned seating position, but not fewer than four (4), mounted in brackets fastened to the apparatus or stored in containers supplied by the SCBA manufacturer.
- One (1) spare SCBA cylinder for each SCBA carried, each mounted in a bracket fastened to the apparatus or stored in a specially designed storage space(s).
- One (1) first aid kit.
- Four (4) combination spanner wrenches.
- Two (2) hydrant wrenches.
- One (1) double female 2.50” (65 mm) adapter with National Hose threads.
- One (1) double male 2.50” (65 mm) adapter with National Hose threads.
- One (1) rubber mallet, for use on suction hose connections.
- Two (2) salvage covers each a minimum size of 12 ft x 14 ft (3.7 m x 4.3 m).
- One (1) traffic vest for each seating position, each vest to comply with ANSI/ISEA 207, Standard for High Visibility Public Safety Vests, and have a five-point breakaway feature that includes two (2) at the shoulders, two (2) at the sides, and one (1) at the front.
- Five (5) fluorescent orange traffic cones not less than 28.00" (711 mm) in height, each equipped with a 6.00” (152 mm) retro-reflective white band no more than 4.00” (152 mm) from the top of the cone, and an additional 4.00” (102 mm) retro-reflective white band 2.00” (51 mm) below the 6.00” (152 mm) band.
- Five (5) illuminated warning devices such as highway flares, unless the five (5) fluorescent orange traffic cones have illuminating capabilities.
- One (1) automatic external defibrillator (AED).
- Four (4) ladder belts meeting the requirements of NFPA 1983, Standard on Fire Service Life Safety Rope and System Components (if equipped with an aerial device).
- If the supply hose carried does not use sexless couplings, an additional double female adapter and double male adapter, sized to fit the supply hose carried, shall be carried mounted in brackets fastened to the apparatus.
• If none of the pump intakes are valved, a hose appliance that is equipped with one or more gated intakes with female swivel connection(s) compatible with the supply hose used on one side and a swivel connection with pump intake threads on the other side shall be carried. Any intake connection larger than 3.00” (75 mm) shall include a pressure relief device that meets the requirements of 16.6.6.
• If the apparatus does not have a 2.50” National Hose (NH) intake, an adapter from 2.50” NH female to a pump intake shall be carried, mounted in a bracket fastened to the apparatus if not already mounted directly to the intake.
• If the supply hose carried has other than 2.50” National Hose (NH) threads, adapters shall be carried to allow feeding the supply hose from a 2.50” NH thread male discharge and to allow the hose to connect to a 2.50” NH female intake, mounted in brackets fastened to the apparatus if not already mounted directly to the discharge or intake.

**SOFT SUCTION HOSE PROVIDED BY FIRE DEPARTMENT**
NFPA 1901, 2016 edition, section 5.8.2.1 requires a minimum of 20’ of suction hose or 15’ of supply hose shall be carried.

Hose is not on the apparatus as manufactured. The fire department shall provide suction or supply hose.

**DRY CHEMICAL EXTINGUISHER PROVIDED BY FIRE DEPARTMENT**
NFPA 1901, 2016 edition, section 5.9.4 requires one (1) approved dry chemical portable fire extinguisher with a minimum 80-B:C rating mounted in a bracket fastened to the apparatus.

The extinguisher is not on the apparatus as manufactured. The fire department shall provide and mount the extinguisher.

**WATER EXTINGUISHER PROVIDED BY FIRE DEPARTMENT**
NFPA 1901, 2016 edition, section 5.9.4 requires one (1) 2.5 gallon or larger water extinguisher mounted in a bracket fastened to the apparatus.

The extinguisher is not on the apparatus as manufactured. The fire department shall provide and mount the extinguisher.

**FLATHEAD AXE PROVIDED BY FIRE DEPARTMENT**
NFPA 1901, 2016 edition, Section 5.9.4 requires one (1) flathead axe mounted in a bracket fastened to the apparatus.

The axe is not on the apparatus as manufactured. The fire department shall provide and mount the axe.

**PICKHEAD AXE PROVIDED BY FIRE DEPARTMENT**
NFPA 1901, 2016 edition, Section 5.9.4 requires one (1) pick head axe mounted in a bracket fastened to the apparatus.
The axe is not on the apparatus as manufactured. The fire department shall provide and mount the axe.

**PAINT**
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. Imperfections on the exterior surfaces shall be removed and sanded to a smooth finish. Exterior seams shall be sealed before painting. Exterior surfaces that shall not be painted include; chrome plating, polished stainless steel, anodized aluminum and bright aluminum treadplate.

2. **Chemical Cleaning and Pretreatment** - All surfaces shall be chemically cleaned to remove dirt, oil, grease, and metal oxides to ensure the subsequent coatings bond well. The aluminum surfaces shall be properly cleaned and treated using a high pressure, high temperature 4 step Acid Etch process. The steel and stainless surfaces shall be properly cleaned and treated using a high temperature 3 step process specifically designed for steel or stainless. The chemical treatment converts the metal surface to a passive condition to help prevent corrosion. A final pure water rinse shall be applied to all metal surfaces.

3. **Surfacer Primer** - The Surfacer Primer shall be applied to a chemically treated metal surface to provide a strong corrosion protective basecoat. A minimum thickness of 2 mils of Surfacer Primer is applied to surfaces that require a Critical aesthetic finish. The Surfacer Primer is a two-component high solids urethane that has excellent sanding properties and an extra smooth finish when sanded.

4. **Finish Sanding** - The Surfacer Primer shall be sanded with a fine grit abrasive to achieve an ultra-smooth finish. This sanding process is critical to produce the smooth mirror like finish in the topcoat.

5. **Sealer Primer** - The Sealer Primer is applied prior to the Basecoat in all areas that have not been previously primed with the Surfacer Primer. The Sealer Primer is a two-component high solids urethane that goes on smooth and provides excellent gloss hold out when top coated.

6. **Basecoat Paint** - Two coats of a high performance, two component high solids polyurethane basecoat shall be applied. The Basecoat shall be applied to a thickness that shall achieve the proper color match. The Basecoat shall be used in conjunction with a urethane clear coat to provide protection from the environment.

7. **Clear Coat** - Two (2) coats of Clear Coat shall be applied over the Basecoat color. The Clear Coat is a two-component high solids urethane that provides superior gloss and durability to the exterior surfaces. Lap style and roll-up doors shall be Clear Coated to match the body. Paint warranty for the roll-up doors shall be provided by the roll-up door manufacture.
Each batch of basecoat color shall be checked for a proper match before painting of the cab and the body. After the cab and body are painted, the color shall verify again to make sure that it matches the color standard. Electronic color measuring equipment shall be used to compare the color sample to the color standard entered into the computer. Color specifications shall be used to determine the color match. A Delta E reading shall be used to determine a good color match within each family color.

All removable items such as brackets, compartment doors, door hinges, and trim shall be removed and separately if required, to ensure paint behind all mounted items. Body assemblies that cannot be finish painted after assembly shall be finish painted before assembly.

The paint finish quality levels for critical areas of the apparatus (cab front and sides, body sides and doors, and boom lettering panels) are to meet or exceed Cadillac/General Motors GMW15777 global paint requirements. Orange peel levels are to meet or exceed the #6 A.C.T. standard in critical areas. These requirements must be met for the exterior paint finish to be considered acceptable. The manufacturer's written paint standards shall be available upon request.

The cab shall be two-tone, with the upper section painted #101 black along with a shield design on the cab face and lower section of the cab and body painted #106 dark red.

**PAINT - ENVIRONMENTAL IMPACT**

Contractor shall meet or exceed all current State regulations concerning paint operations. Pollution control shall include measures to protect the atmosphere, water and soil. Controls shall include the following conditions:

- Topcoats and primers shall be chrome and lead free.
- Metal treatment chemicals shall be chrome free. The wastewater generated in the metal treatment process shall be treated on-site to remove any other heavy metals.
- Particulate emission collection from sanding operations shall have a 99.99% efficiency factor.
- Particulate emissions from painting operations shall be collected by a dry filter or water wash process. If the dry filter is used, it shall have an efficiency rating of 98.00%. Water wash systems shall be 99.97% efficient
- Water from water wash booths shall be reused. Solids shall be removed on a continual basis to keep the water clean.
- Paint wastes are disposed of in an environmentally safe manner.
- Empty metal paint containers shall be to recover the metal.
- Solvents used in clean-up operations shall be recycled on-site or sent off-site for distillation and returned for reuse.

Additionally, the finished apparatus shall not be manufactured with or contain products that have ozone depleting substances. Contractor shall, upon demand, present evidence that the
manufacturing facility meets the above conditions and that it follows State EPA rules and regulations.

**PAINT/SEAL CHASSIS FRAME ASSEMBLY**

The following components shall be treated with epoxy E-coat protection prior to finish paint:

- Two (2) C-channel frame rails
- Two (2) frame liners

The E-coat process shall meet the technical properties shown.

Before the frame rails are finish painted, all areas shall be sealed with a 3M 2084 metal sealant after the components are torqued to the frame rails:

- The joint between the main frame and the liner
- The joint between all crossmembers and the frame
- The joint between all spring hangers and the frame.

The chassis frame assembly shall be finished with primer and gloss paint to match the lower job color 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 are included with the chassis frame assembly that shall be finish painted are:

- Frame rails
- Frame liners
- Cross members
- Axles
- Suspensions
- Steering gear
- Battery boxes
- Bumper extension weldment
- Frame extensions
- Body mounting angles
- Rear Body support substructure (front and rear)
- Pump house substructure
- Air tanks
- Steel fuel tank
- Castings
• Individual piece parts used in chassis and body assembly

After the chassis frame assembly is finish painted, the following non-torqued joints shall be sealed with a SG-510A rust-proofing compound:

- All bolted-on chassis components that could be vulnerable to rust, i.e. body mounting angles, air tanks, etc.

To summarize, all metal to metal contact components that are prone to rust, shall be protected.

**COMPARTMENT INTERIOR PAINT**
Interior of compartmentation shall be painted with a gray spatter type paint.

**REFLECTIVE BAND**
An 8.00" black reflective band shall be provided across the front of the vehicle and along the sides of the cab and body.

**CHEVRON STRIPING ON THE FRONT BUMPER**
There shall be alternating chevron striping located on the front bumper.

The colors shall be red and fluorescent yellow green diamond grade.

The size of the striping shall be 6.00".

**REAR CHEVRON STRIPING**
There shall be alternating chevron striping located on the rear-facing vertical surface of the apparatus. The 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.

This shall meet the requirements of the current edition of NFPA 1901, which states that 50% of the rear surface shall be covered with chevron striping.

**JOG(S) IN REFLECTIVE BAND**
The reflective band located on each side of the apparatus body shall contain one (1) jog(s) and shall be angled at approximately a 45 degrees when installed.

**SIGN GOLD STRIPE**
There shall be a Sign Gold stripe applied above and below the reflective band. The Sign Gold stripes shall be .50" wide with an outline.

**REFLECTIVE STRIPE INSIDE RUBRAILS**
A reflective stripe shall be provided inside the extruded aluminum rub rails. The reflective material shall be D.O.T. type Red/White stripe. There shall be a quantity of four (4) rub rails striped.
INVERTED "V" CHEVRON STRIPING ON CAB AND CREW CAB DOORS
There shall be alternating chevron striping located on the inside of each cab and crew cab door.

The striping shall consist of the following colors:

The first color shall be red diamond grade

The second color shall be fluorescent yellow green diamond grade

The size of the striping shall be 6.00".

BODY STRIPE
There shall be a genuine gold leaf stripe provided on each side of the body, over the fender.

CAB FACE STRIPE
There shall be a genuine gold leaf stripe across the face of the cab.

CAB STRIPE
There shall be a genuine gold leaf stripe provided on both sides of the cab in place of the chrome molding.

LETTERING
The lettering shall be totally encapsulated between two (2) layers of clear vinyl.

LETTERING
Forty-one (41) to sixty (60) genuine gold leaf lettering, 3.00" high, with outline and shade shall be provided.

WEB SITE ADDRESS LETTERING, REFLECTIVE
There shall be a one (1) pair of web site addresses, in 1.00" to 2.00" reflective lettering, installed on cab window.

LETTERING
There shall be reflective lettering, 4.00" high, with outline and shade provided. There shall be ten (10) letters provided.

LETTERING
There shall be genuine gold leaf lettering, 6.00" high, with outline and shade provided. There shall be seven (7) letters provided.

LETTERING
There shall be reflective lettering, 18.00" high, with outline and shade provided. There shall be four (4) letters provided.

LETTERING
There shall be genuine gold leaf lettering, 10.00" high, with outline and shade provided. There shall be four (4) letters provided.
LETTERING
Twenty-one (21) to forty (40) genuine gold leaf lettering, 8.00" high, with outline and shade shall be provided.

"AMERICAN FLAG" EMBLEMS
There shall be one (1) pair of emblems, 10.00" wide, featuring an "American Flag" and a "Printed Effect Gold Leaf Ribbon", installed upper crew cab.

EMBLEMS
There shall be one (1) pair(s) of printed effect gold leaf 9-11 emblems provided. The emblems shall be installed raised roof.

MALTESE CROSS INSTALLATION
There shall be one (1) pair of maltese crosses, comprised of genuine gold leaf material, provided and installed cab doors.

CAB GRILLE DESIGN
An American flag design shall be painted on the cab grille.

FIRE APPARATUS PARTS MANUAL
There shall be two (2) custom parts manual(s) in USB flash drive format for the complete fire apparatus provided.

The manual(s) shall contain the following:

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

Each manual 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.

SERVICE PARTS INTERNET SITE
The service parts information included in these manuals are also available on the factory website. The website offers additional functions and features not contained in this manual, such as digital photographs and line drawings of select items. The website also features electronic search tools to assist in locating parts quickly.

CHASSIS SERVICE MANUALS
There shall be two (2) chassis service manuals on USB flash drives 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
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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.

**CHASSIS OPERATION MANUAL**

The chassis operation manual shall be provided on two (2) USB flash drives.

**ONE (1) YEAR MATERIAL AND WORKMANSHIP**

Each new piece of apparatus 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 (no exception).

**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.

**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.

**FIFTY (50) YEAR STRUCTURAL INTEGRITY**

The chassis frame and crossmembers shall be provided with a fifty (50) year material and workmanship limited warranty. The warranty shall cover the chassis frame and crossmembers 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 (no exception).
<p>| Specification for the Deerfield-Bannockburn Fire Department dated 10/22/19 |
|---|---|
| <strong>FRONT AXLE THREE (3) YEAR MATERIAL AND WORKMANSHIP WARRANTY</strong> |
| Independent front suspension shall be provided with a <strong>three (3) year</strong> 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 (no exception). |
| <strong>REAR AXLE TWO (2) YEAR MATERIAL AND WORKMANSHIP WARRANTY</strong> |
| A Meritor™ Axle <strong>two (2) year</strong> limited warranty shall be provided. |
| <strong>ABS BRAKE SYSTEM THREE (3) YEAR MATERIAL AND WORKMANSHIP WARRANTY</strong> |
| A Meritor Wabco™ ABS brake system <strong>three (3) year</strong> limited warranty shall be provided. |
| <strong>TEN (10) YEAR STRUCTURAL INTEGRITY</strong> |
| The new cab shall be provided with a <strong>ten (10) year</strong> 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 (no exception). |
| <strong>TEN (10) YEAR PAINT AND CORROSION</strong> |
| Each new piece of apparatus shall be provided with a <strong>ten (10) year</strong> 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 (no exception). |
| <strong>FIVE (5) YEAR MATERIAL AND WORKMANSHIP</strong> |
| The electronic modules and display(s) shall be provided with a <strong>five (5) year</strong> 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 (no exception). |
| <strong>COMPARTMENT LIGHT WARRANTY</strong> |
| 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 (no exception). |</p>
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<th>Bidder Complies</th>
<th>Yes</th>
<th>No</th>
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**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.

**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.

**WATER TANK WARRANTY**
The UPF 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 (no exception).

**TEN (10) YEAR STRUCTURAL INTEGRITY**
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 (no exception).

**ROLL UP DOOR MATERIAL AND WORKMANSHIP WARRANTY**
A R-O-M Corporation roll-up door limited warranty shall be provided. The mechanical components of the roll-up door shall be warranted against defects in material and workmanship for a period of seven (7) years. The door ajar switch shall be warranted for a period of three (3) years and all other electrical components shall be warranted for a period of one (1) year. A seven (7) year limited warranty shall be provided on painted roll up doors.

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

**SIX (6) YEAR PARTS, ONE (1) YEAR LABOR**
The pump and its components shall be provided with a six (6) year parts and one (1) year labor 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 (no exception).

**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 covers 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 is extended only to the original purchaser for a period of ten years from the date of delivery.

A copy of the warranty certificate shall be submitted with the bid package (no exception).

**FOAM SYSTEM WARRANTY**

A one (1) year material and workmanship limited warranty shall be provided on the Husky 12 foam system. A five (5) year material and workmanship limited warranty shall be provided on the foam system control head.

A copy of the warranty certificate shall be submitted with the bid package (no exception).

**12 YEAR PAINT AND CORROSION**

Each new piece of apparatus shall be provided with a 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 (no exception).

**THREE (3) YEAR MATERIAL AND WORKMANSHP**

The gold leaf lamination shall be provided with a three (3) year material and workmanship limited warranty. The warranty shall cover the gold leaf lamination 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 (no exception).

**VEHICLE STABILITY CERTIFICATION**

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

**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 available prior to the time of bid.

**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.
## CAB INTEGRITY CERTIFICATION

The fire apparatus manufacturer shall provide a cab integrity certification with this proposal. The certification shall state that the cab has been tested and certified by an independent third-party test facility. Testing events shall be documented with photographs, real-time and high-speed video, vehicle accelerometers, cart accelerometers, and a laser speed trap. 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 COE 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 120,000 lbs. This value exceeds the ECE 29 criteria by nearly 5.4 times.
- **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 shall 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.

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

## CAB DOOR DURABILITY CERTIFICATION

Robust cab doors help protect occupants. Cab doors shall survive a 200,000-cycle door slam test where the slamming force exceeds 20 G’s of deceleration. The bidder shall certify that the sample doors like those provided on the apparatus have been tested and have met these criteria without structural damage, latch malfunction, or significant component wear.

## WINDSHIELD WIPER DURABILITY CERTIFICATION

Visibility during inclement weather is essential to safe apparatus performance. 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 successful bidder shall certify prior to delivery that the wiper system design has been tested and that the wiper system has met these criteria.
**ELECTRIC WINDOW DURABILITY CERTIFICATION**
Cab window roll-up systems can cause maintenance problems if not designed for long service life. The window regulator design shall complete 30,000 complete up-down cycles and still function normally when finished. The bidder shall certify that sample doors and windows similar to those provided on the apparatus have been tested and have met these criteria without malfunction or significant component wear.

**SEAT BELT ANCHOR STRENGTH**
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 successful bidder shall certify that each anchor design was pull tested to the required force and met the appropriate criteria.

**SEAT MOUNTING STRENGTH**
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 successful bidder shall certify that each seat mount and cab structure design was pull tested to the required force and met the appropriate criteria.

**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 that the defrost system design has been tested in a cold chamber and passes the SAE J381 criteria.

**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 that a substantially similar heater has been tested and has met these criteria.

**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 that a substantially similar air conditioning system has been tested and has met these criteria. The certification shall be available at the time of bid.
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 or 1906 (Current Edition).
  - The minimum continuous load of each component that is specified per:
    - Applicable NFPA 1901 or 1906 (Current Edition).
  - Additional loads that, when added to the minimum continuous load, determine the total connected load.
  - Each individual intermittent load.

All the above listed items shall be provided by the bidder per the applicable NFPA 1901 or 1906 (Current Edition).