

CITY OF ROCHESTER, NH
SPECIFICATIONS FOR 100' AERIAL PLATFORM

Invitation To Bid
RE-BID

The City of Rochester, New Hampshire is accepting sealed bids from qualified applicants to provide. SPECIFICATIONS FOR 100' AERIAL PLATFORM FIRE TRUCK. All bids must be submitted in a sealed envelope plainly marked:

“Sealed Bid, 100' AERIAL PLATFORM FIRE TRUCK

“BID # 08-24“

City of Rochester, New Hampshire,
31 Wakefield St.
Rochester, NH 03867
Attn: Purchasing Agent

All bids must be received no later than at Thursday, January 10, 2008 at 2:30 PM. No late bids, telephone bids, or faxed bids will be accepted. Bid proposals and specifications may be obtained from the City of Rochester Website, www.rochesternh.net or by emailing purchasing@rochesternh.net, calling the Purchasing Agent at 603-335-7602 or at the City of Rochester, Business Office, 31 Wakefield Street, Rochester NH. All bids must be made on the bid forms supplied and the bid form must be fully completed when submitted.

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INSTRUCTIONS TO BIDDERS

I. Preparation of Bid Proposal

- A. The Bidder shall submit her/his proposal upon the forms furnished by the City (attached). The Bidder shall specify the unit price or lump sum bid, both in words and figures for each pay item listed. All words and figures shall be in ink or typed.
- B. If an amount entered by the bidder on the proposal form is to be altered it should be crossed out with ink, the new unit price or lump sum bid entered above or below it, and initialed by the bidder, also with ink. In a case of discrepancy between the prices written in words and those written in figures, the prices written in words shall govern.
- C. The Bidder's proposal must be signed with ink by the individual, by one or more members of the partnership, by one or more members or officers of each firm representing a joint venture, by one or more officers of a corporation, or by an agent of the contractor legally qualified and acceptable to the owner. If the proposal is made by an individual, his name and post office address must be shown; as a joint venture, the name and post office address of each must be shown; by a corporation, the name of the corporation and its business address must be shown, together with the name of the state in which it is incorporated, and the names, titles, and business address of the President, Secretary, Treasurer.
- D. All questions shall be submitted in writing to the Purchasing Agent. The Purchasing Agent will then forward both the question and the City's response to the question to all prospective bidders.

II. Irregular Proposals

Bid proposals will be considered irregular and may be rejected for any of the following reasons:

- A. If the proposal is on a form other than furnished by the Owner, or if the form is altered or any thereof is detached.
- B. If there are unauthorized additions, conditional or alternated bids, or irregularities of any kind which may tend to make the proposal incomplete, indefinite, or ambiguous as to its meaning.
- C. If the bidder adds any provisions reserving the right to accept or reject an award, or to enter into a contract pursuant to an award.

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- D. If the proposal does not contain a unit price for each pay item listed, except in the case of authorized alter pay items.

III. Interpretations

No oral interpretations will be made to any vendor as to the meaning of the specifications or terms and conditions of this sealed proposal invitation.

IV. Withdrawal of Bid Proposals

A bidder will be permitted to withdraw his proposal unopened after it has been deposited if such request is received in writing prior to the time specified for opening the proposals.

No bid may be withdrawn, for a period of (60) sixty days subsequent to the opening of bids, without express written consent of the City of Rochester, NH.

V. Public Opening of Proposals

Proposals will be opened and read publicly at the time and place indicated in the invitation for bids. Bidders, their authorized agents, and other interested parties are invited to be present. All bid results will be posted within 48 hrs of the bid opening on the City of Rochester's website.

VI. Disqualification of Bidders

Either of the following reason may be considered as being sufficient for the disqualification of a bidder and the rejection of his proposal of proposals:

- A. Evidence of collusion among bidders.
- B. Failure to supply complete information as requested by bid specifications.

AWARD AND EXECUTION OF CONTRACT

I. Consideration of Proposals

- A. Bids will be made public at the time of opening and may be reviewed only after they have been properly recorded. In case of discrepancy between the prices written in words and those written figures, the written in words shall govern. In case of discrepancy between the total shown in the proposal and that obtained by adding the products of the quantities of items and bid prices, the latter shall govern.

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- B. The right is reserved to reject any or all proposals, to waive technicalities or to advertise for new proposals, if in the judgment of the City, the best interest of the City of Rochester will be promoted thereby.

II. Award of Contract

If a contract is to be awarded, the award will be made to the lowest responsible and qualified bidder whose proposal complies with all the requirements prescribed as soon as practical after the bid opening. No bid shall be withdrawn for a period of (60) sixty days subsequent to the opening of bids, without the consent of the city of Rochester. The successful bidder will be notified, by the form being mailed to the address on his proposal, that his bid has been accepted and that he has been awarded the contract.

III. Cancellation of Award

The City reserves the right to cancel the award of any contract at any time before the execution of such contract by all parties without any liability against the City.

BID EVALUATION

In addition to the bid amount, additional factors will be considered as an integral part of the bid evaluation process including, but not limited to:

- A. The bidder's ability, capacity, and skill to perform within specified time limits.
- B. The bidder's experience, reputation, efficiency, judgment, and integrity.
- C. The quality, availability and adaptability of the supplies and materials sold.
- D. Bidder's last performance.
- E. Sufficiency of bidder's financial resources to fulfill the contract.
- F. Bidder's ability to provide future maintenance and/or services.
- G. Other applicable factors as the City determines necessary or appropriate (such as compatibility with existing equipment).

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Vendor Name _____

Address _____

Phone _____

Signature _____

Title _____

Date _____

BID PRICE FOR SERVICE _____
(in figures) (in words)

HISTORY/PROFILE _____

QUALIFICATIONS _____

LIST OF PREVIOUS RELEVANT PROJECTS

Summary of Project: _____

Start up and completion dates: _____

Project Cost: _____

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Name and telephone number of reference for the listed project:_____

All Bids are to be submitted on this form and in a sealed envelope, plainly marked on the outside with the Bidder's name and address and the Project name as it appears at the top of the Proposal Form. All bid results will be posted on the City of Rochester website within 48 hrs of the bid opening.

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Intent of Specifications

It is the intent of these specifications to cover the furnishing and delivery to the Purchaser of a complete vehicle equipped as hereinafter specified. With a view to obtaining the best results and the most acceptable apparatus, these specifications cover minimum requirements as to the type of construction, finish, and test to which the apparatus must conform, together with certain details as to equipment and appliances to be furnished. Minor details of construction and materials, where not otherwise specified, are left to the discretion of the contractor, who shall be solely responsible for the design and construction. The apparatus shall conform to the requirements of the current (at the time of bid) NFPA Standard for Aerial Ladder Fire Apparatus to the extent specified herein.

BIDDERS ARE ADVISED THAT THIS SECTION OF THE SPECIFICATIONS WILL BE EVALUATED BEFORE THE APPARATUS TECHNICAL SPECIFICATIONS. BIDS THAT DO NOT COMPLY WITH OUR BONDING, INSURANCE, DELIVERY, BIDDER QUALIFICATIONS, SERVICE, AND WARRANTY REQUIREMENTS WILL BE IMMEDIATELY DEEMED NON-RESPONSIVE AND SHALL BE IMMEDIATELY REJECTED WITHOUT FURTHER REVIEW OF THE TECHNICAL SPECIFICATIONS.

Qualification of Bidders

Bids will only be considered on vehicles constructed in the continental United States, whose manufacturers have an established reputation of permanency and reliability in the field of fire apparatus construction. Each manufacturer shall furnish satisfactory evidence of their ability to construct the apparatus as specified, and shall state the location of the factory where the **complete** apparatus will be built. **If chassis, body, water tank, and aerial device are manufactured in different facilities, the location of each facility shall be stated in the bid.** Experimental apparatus, or apparatus using a subcontracted body, chassis, water tank or aerial device will not be acceptable.

Please state the location where the following vehicle components will be constructed:

Chassis _____
Body _____
Tank _____
Aerial Device _____

- ◆ How long has the manufacturer been building chassis at this location?

Number of years _____

- ◆ How long has the manufacturer been building bodies at this location?

Number of years _____

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- ◆ How long has the manufacturer been building the Aerial device at this location?

Number of years_____

Bidders must state the location of at least thirty (30) communities in New England using similar apparatus supplied by them.

The solvency of manufacturers is a prime concern of the Purchaser. Each bid must include a certified financial statement from a nationally recognized accounting firm. Failure to submit such a statement shall result in immediate rejection of a proposal.

Service Requirements

It is the intent of the City of Rochester to assure that parts and service are readily available for the apparatus specified. **SERVICE CAPABILITIES WILL BE A MAJOR CRITERIA FOR AWARD OF THIS BID.** To insure proper service, no bid will be accepted unless the bidder owns or offers facilities within 150 miles where complete parts and service are available. Full time personnel who are factory trained and EVT certified in the operation and repair of the fire apparatus, including the pump, with full authorization of the manufacturer, must staff the facility. The facility shall maintain a complete inventory including major pump parts, body components, electrical items, fire apparatus hardware, etc., and shall offer on-site services including pump overhaul, body fabrication, collision repair, and a paint shop complete with a cross flow booth with air makeup and bake options to insure the highest quality paint finish available. The bidder must also operate an on-site pump test facility and must be an "Authorized Parts and Service Center" for Hale Pumps, and provide proof thereof. Bids from manufacturers who use third party service people or facilities, or who do not offer a service center, will be immediately rejected. Furthermore, due to a concern over having vehicles "out-of-service" for extended periods of time as a result of having to be sent back to the original manufacturer's location for repairs, any bidder who cannot guarantee that all future repairs will be handled at a local level will not be acceptable.

Exceptions

Substitutions, deviations, clarifications, or exceptions to the technical specifications must be listed on a separate page marked, "EXCEPTIONS", and must be accompanied by adequate supportive data to allow the Fire Chief to determine acceptability. Proposals that are found to have deviations without listing them will be rejected. Components identified by brand names are available to all prospective bidders and exceptions shall not be allowed on these items.

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Service Questionnaire

The bidder shall include the following information with their bid.

- ◆ Number of miles from the purchaser to the nearest staffed service facility owned and operated by the bidder

Number of miles _____

- ◆ The number of service bays and square feet of service space at the bidder's service facility.

Number of bays _____ Square feet _____

- ◆ The length of time the service facility has been in business as an emergency vehicle dealer.

Number of years in business _____

- ◆ How long has the dealer been selling the brand of emergency vehicle being proposed?

Number of years _____

- ◆ Has the dealer/distributor represented other manufacturers of emergency vehicles in the past?

Yes _____ No _____

If yes, why was the change made? _____

- ◆ Number of emergency vehicles that have been delivered by the dealer/distributor since it has been in business representing its current "brand(s)" of emergency vehicles

Number of vehicles delivered _____

- ◆ Is the dealership strictly dedicated to selling and servicing emergency vehicles and equipment, or do they sell and service other products?

Strictly dedicated to emergency vehicles and equipment? Yes _____ No _____

- ◆ On-site pump test facility?

Yes _____ No _____

- ◆ Number of EVT Certified personnel employed? EVT "Master Mechanics"?

EVT certified personnel ____ EVT "Master Mechanics" ____

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- ◆ Number of full-time mechanics employed by the bidder that are solely dedicated to servicing emergency vehicles?

Number solely dedicated to emergency vehicle service ____

- ◆ Full body/collision repair, fabrication, and paint booth on-site?

Yes ____ No ____

- ◆ Over \$400,000 in parts inventory available at all times?

Yes ____ No ____

- ◆ "Authorized" Hale Parts and Service Center?

Yes ____ No ____

- ◆ Does the local service facility accept work on other vehicles (i.e., DPW, oil, concrete, etc..) or fleet trucks in addition to emergency vehicles on a regular basis?

Yes ____ No ____

- ◆ If yes, what percentage of repair work is non emergency vehicle related?

Yes ____ No ____

- ◆ Does the possibility exist that the emergency vehicle may have to go back to the original manufacturer's location for warranty work?

Yes ____ No ____

If yes, please describe some examples

- ◆ Does the dealer/distributors service facility perform ALL warranty work for the products they represent?

Yes ____ No ____

If no, please describe where work may be performed _____

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Delivery

The apparatus shall be delivered under its own power to assure adequate break-in while under warranty. It shall first be transported to the local service facility, where final inspection and preparation will be performed, including mounting of related equipment. The apparatus will then be delivered to the Purchaser's location.

Post-Delivery Training

On four (4) mutually agreeable dates after delivery, a certified delivery engineer shall familiarize those persons designated by the Fire Chief with the basic operation of the apparatus and its components. Such training must be coordinated by a fire department officer with a minimum of 20 years of "hands on" experience on the fire ground. This shall be a full instructional program including both classroom and practical or "hands on" training. Limited programs or "drop-off" type deliveries are unacceptable.

Construction Time

The completed apparatus shall be delivered within 270 calendar days after the signing of the contract. In the interest of public safety, this delivery date is an extremely important consideration.

Insurance Certificate

A Manufacturer's Certificate of product liability and facility insurance equal to or exceeding \$25,000,000.00 must be provided with the bid. The certificate must be in original form (no photocopies or fax copies) and shall name the City of Rochester NH as the certificate holder.

Bid Bond

A bid bond in the amount of fifteen (15) percent of the bid price shall accompany each bid. Bids submitted without a bond will not be read. An Insurance Company registered with the Insurance Commissioner of the State of NH must issue the bid bond. An Officer of the Bidder's Company must sign bonds. Bonds issued by non-registered or foreign Insurance Companies will be immediately rejected.

Performance Bond

A Performance Bond in the amount of 100% of the contract price must be furnished within thirty (30) days of signing the contract. The Performance Bond must be issued by an Insurance Company registered with the Insurance Commissioner of the State of NH and must be signed by an Officer of the bidder's company. Bonds issued by non-registered or foreign Insurance Companies will be immediately rejected. The cost of the performance bond must be stated to give the purchaser an idea of the financial stability of the bidder.

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Contract

These specifications, together with any documents required herein, shall be included in the final contract. Each bidder shall submit a copy of their proposed contract form.

Warranty

Each bidder shall submit a copy of their standard Warranty in compliance with State and Federal regulations. It shall provide coverage for a minimum of a one (1) year period. The bidder must also submit a ten (10) year corrosion perforation warranty, a ten (10) year limited paint warranty, a lifetime frame warranty, a ten (10) year stainless steel plumbing warranty, a ten (10) year cab and body structural warranty and a twenty (20) year aerial structural warranty. Warranty forms must be submitted with the bid package. Altered forms will not be accepted, and will be grounds for disqualification.

ECE R-29 Crash Testing w/Third Party Certification

In the interest of firefighter safety, the specified cab must meet and exceed the ECE R-29 crashworthiness standard. Third party certification of the actual test results must be provided to authenticate the results of the testing.

Emergency Vehicle Technician Qualifications

Due to the highly specialized nature of fire apparatus repair, emergency vehicle technicians employed by the bidder shall be in conformance with NFPA standards 1915 and 1071. Proof of current certifications shall be supplied with the bid. There shall be no exceptions to this requirement. Bids from organizations that do not meet these requirements shall be immediately rejected.

ISO Compliance

The manufacturer shall 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.

Are all of the specific manufacturing plants that are building the body, chassis, water tanks, and aerial device certified by ISO 9001?

Yes _____ No _____

Electronic Manuals

Two (2) copies of all operator, service, and parts manuals **MUST** be supplied at the time of delivery in electronic format (CD-ROMs) – **NO EXCEPTIONS!** The electronic manuals shall include the following information:

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- Operating instructions, descriptions, specifications, and ratings for the chassis, installed components, and auxiliary systems.
- Warnings and cautions pertaining to the operation and maintenance of the fire apparatus and fire fighting systems.
- Charts, tables, checklists, and illustrations relating to lubrication, cleaning, troubleshooting, diagnostics, and inspections.
- Instructions regarding the frequency and procedure for recommended maintenance.
- Maintenance instructions for the repair and replacement of installed components.
- Parts listing with descriptions and illustrations for identification.
- Warranty descriptions and coverage.

Note: Engine overhaul, engine parts, transmission overhaul, and transmission parts manuals are not included.

The CD-ROM shall incorporate a navigation page with electronic links to the operator's manual, service manual, parts manual, and warranty information, as well as instructions on how to use the manual. Each copy shall include a table of contents with links to the specified documents or illustrations. The CD must be formatted in such a manner as to allow not only the printing of the entire manual, but also the cutting, pasting, or copying of individual documents to other electronic media, such as electronic mail, memos, and the like. A find feature shall be included to allow for searches by text or by part number. These electronic manuals shall be accessible from any computer operating system capable of supporting portable document format (PDF). Permanent copies of all pertinent data shall be kept on file at both the local dealership and at the manufacturer's location.

General Construction

The general construction of the apparatus shall give due consideration to distribution of the load to be sustained, and to the general character of the service to which the vehicle will be subjected when placed in service. Ample safety factors must be provided.

The apparatus body must be of the all aluminum modular type, and shall be completely assembled prior to installation on the chassis. Bodies comprised of bolted sub-assemblies, or supported by superstructures of dissimilar metals will not be acceptable. Formed aluminum construction in place of extruded construction specified will not be acceptable.

Special consideration will be given to the following points: accessibility of various components requiring periodic maintenance, ease of operation, and symmetrical proportions.

Aerial Requirements

It is the intent of the City of Rochester to obtain the safest aerial device available that fully complies with the current edition of NFPA 1901 guidelines and requirements for an aerial ladder. It is the intent to provide proof positive evidence to the purchasing organization and the

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employees that utilize aerial devices that the aerial we intend to purchase meets and/or exceeds the minimum standards and safety requirements as established by NFPA for aerial ladders. By receiving written verification for, and certification to aerial design and NFPA safety factors from prospective aerial manufacturers in advance of purchasing or specifying for bid, it is our intent to determine acceptable, qualified manufacturers. All information and documentation requested herein shall be provided by the bidder in order for the manufacturer to be considered as a qualified manufacturer.

The City of Rochester places the highest importance on the safety interlock system as specified. No exception will be allowed. The department will not accept those interlock systems, which allow aerial operation with partially extended jack legs (commonly referred to as "short-jacking").

Due to the lower center of gravity provided by the specified jackleg system, no exception would be allowed for this requirement. Jacklegs that eliminate compartment storage space will not be considered. No exception will be allowed for the jack width specified. This is to insure that the department will be able to set up the device in virtually all instances and maintain full jack extension at all times, therefore the device can be operated at full capabilities.

BID QUESTIONS

- Does the actual aerial manufacturer provide a minimum of \$25 million dollar Product Liability Insurance on the entire apparatus?

YES NO

- Is the entire apparatus (cab, chassis, body, and aerial device) manufactured by the same company at the same factory location?

YES NO

- Indicate the number of years the aerial manufacturer has been providing aerials to the body manufacturer. _____

- Indicate the number of years the aerial manufacturer has been in business manufacturing NFPA compliant aerials. _____

- Is the aerial device tested at the aerial manufacturer's facility by a third party (independent) professional testing company per NFPA 1901 and 1914 standards?

YES NO

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- How many years has the actual aerial manufacturer been in business designing and manufacturing aerial devices specifically used in the fire service?
- Has any aerial device that the actual aerial manufacturer constructed, or the bidding contractor has constructed or assembled, suffered a catastrophic structural failure while in service?

YES NO

- Has any aerial device that the actual aerial manufacturer constructed, or the bidding contractor has constructed or assembled, ever tipped over while in service or during an in-service test?

YES NO

- What is the Structural Safety Factor of the aerial device you are bidding, as defined by NFPA 1901 Section A-18-20.1? What is the Structural Safety Factor of the serial device while flowing water?

Safety Factor: _____ While Flowing: _____

- State the Stability Safety Factor of the aerial device as defined by NFPA 1901 Sections 18-21.1 through 18-21.1.2.

Stability Factor: _____

- Does the actual aerial manufacturer have a Quality Control Program such as ISO 9001 in place and functional as required by NFPA 1901 sections 18-22.1 through 18-22.5.6?

YES NO

- Does the actual aerial manufacturer have every ladder it manufacturers tested by a third party professional testing company to the following minimum tests?
- What is the number of outriggers required for the aerial device that you are bidding?

State the type of out riggers: _____(i.e., "A" frame, "H" style, etc..)

State the maximum jack spread of the outriggers at full extension: _____

- Must all jacks be at full extension to maintain all rated load capacities?

YES NO

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- Can outriggers be “short set” or “short jacked”

YES NO

If YES, provide a copy of the Load Chart that will be permanently attached to the aerial that clearly indicates all rated loads with the aerial device in the “short jacked” condition. Can this system be over-ridden at any time?

- Is jackleg “pins” provided to be manually inserted into the jacklegs?

YES NO

- Are rated loads affected if the pins are not used?

YES NO

If NO, provide documented evidence of this fact.

- Are the vehicle tires required to remain in contact with the ground for purposes of stability during aerial operations?

YES NO

- Are rated loads affected if the tires do not remain in contact with the ground?

YES NO

- Is the weight of firefighting equipment included in the tip load rating of the aerial device?

YES NO

If YES, how much weight is allowable on the device? _____ lbs.

- Are rung covers utilized on the walking rungs?

YES NO

If YES, how are the rung covers attached? _____

If YES, clearly state type of material utilized: _____

- Do the rung covers meet NFPA 1901 Section 16-2.5?

YES NO

- Are the rung covers susceptible to melting, peeling, splitting, or drying out?

YES NO

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- What is the current cost for replacement of all rung covers? _____

- Are the ladder sections painted?

YES NO

If YES, why are the ladder sections painted?_____

- What is the current cost to completely repaint the entire aerial device?
- Does the aerial device have an automatic interlock device that prevents the aerial from being operated if the jacks are not set?

YES NO

- Is there an aerial device similar to the model the purchaser intends to purchase located within 100 miles of the department?

YES NO

If YES, provide contact information for dept. to contact owner.

Bid Format

Each bidder shall supply a detailed description of the apparatus and equipment, which they propose to furnish, and to which the apparatus furnished under the contract must conform. In addition, in order that all proposals may be compared on an equivalent basis, all proposals must be presented in the same sequence as these published specifications. Bids that do not comply with this important requirement shall be deemed non-responsive, and shall be rejected.

Each bid shall include all construction details of the apparatus they propose to furnish. The complete apparatus body must be built of 100% all-aluminum construction. Each vendor must state in their bid, in specific and detailed terms, the grade of aluminum alloys used, the thickness of all sheet metal and extrusions used, body mounting method employed, and complete construction details of the following:

- Body corners and mainframe construction
- Body crossmembers and supports
- Wheelwells and trim
- Beavertail and rear step construction
- Hosebed construction
- Compartment construction, door construction

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- Step construction; running board construction
- Pump operator's control panel
- All plumbing and controls and gauges
- Tank construction
- Body mounting
- Paint finish
- Ladder construction and ease of operation
- Jack construction and ease of operation
- Width of jacks when fully extended.

Cab Crashworthiness Requirement

The apparatus cab shall meet and/or exceed relevant load and impact tests required for compliance certification with United Nations Regulation No. 29, Addendum 28, Revision 1, "Uniform Provisions Concerning the Approval of Vehicles with Regard to the Protection of the Occupants of the Cab of a Commercial Vehicle".

As parts of this (Regulation No. 29), a pendulum weight of 3,700 lbs. shall strike the apparatus cab with a frontal impact. The pendulum weight shall have been released from approximately 9-feet above the cab, imparting over 32,500 ft. pounds of energy into the cab. This event shall simulate a 3,700-lb. vehicle hitting the cab at 16.2 mph. Upon completion, there shall be minimal to no intrusion into the cab's passenger space. Moreover, the cab doors shall be capable of opening readily.

A copy of a certificate or letter verifying minimum compliance to Regulation No. 28 by an independent licensed professional engineer shall be provided upon request.

In terms of exceeding the requirements of Regulation No. 29, the apparatus shall be capable of withstanding with minimal intrusion to the occupant area, the following tests:

1. With the respective apparatus cab positioned at an angle of 49 degrees to a line running perpendicular the center of a pendulum test weight (3,700 lb.), or 41 degrees to a line running parallel to the face of the same weight, an impact test shall have been executed. A 3,700 lb. pendulum shall have been positioned to strike the drivers side corner of the cab with the center of gravity of the pendulum at 53-inches above the ground reference plane. The pendulum test weight shall have been released from a height of 158.25 inches above the same ground reference plane. At this drop height, when released, the pendulum shall impart

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32,715 t. pounds of energy to the driver's side corner. Upon completion, the resultant impact shall not cause significant intrusion to the driver's space. This shall have been verified with the placement of a 50th percentile male mannequin into the driver's seat after the impact.

2. After completion of the tested noted in #1 above, the apparatus cab shall have been submitted to a static cab roof load test exceeding Regulation No. 29. With minimal deformation intrusion, the cab structure shall withstand a load of 54,300 lbs. exceeding Regulation No. 29 by two and half times the required amount.

For any or the entire above test, the cab manufacturer shall provide either photographs or video footage of the procedure upon request.

Diamon-Fusion Hydropobic Application

A Diamon- Fusion product that strengthens glass to resist costly chips, cracks and scratches shall be installed on the front windshield of the vehicle. The application of the product will make the windshield hydrophobic so that water will run off instantly. It shall improve clarity and visibility to shorten driver reaction time, it also makes snow and ice removal easier and resists dangerous UV rays. The application process shall last for several years. Due to the critical safety improvements this application shall provide, exceptions shall not be allowed to this exact process.

Front Bumper

The vehicle shall be equipped with a one-piece 10" high bumper, made from 10-gauge (0.135" nominal) polished stainless steel for corrosion resistance, strength, and long-lasting appearance. It shall be mounted directly to the front frame extensions for maximum strength. The bumper shall incorporate two (2)-stiffening ribs.

The bumper extension shall be approximately 20" from the face of the cab as required. The extended front bumper gravel shield shall be made of 1/8" (.125") aluminum treadplate material.

Bumper Tray

A hose tray constructed of 1/8" aluminum shall be recessed into the front bumper extension. It shall be located center of the bumper. One-inch thick aluminum slats shall be included in the bottom of the hose tray to aid in the dissipation of water from the tray. The center bumper tray shall have a diamond plate lid. The lid shall be hinged and shall be secured in the closed position by a D-Ring latch and held open with a pneumatic shock. The approximate dimension shall be 34"x13"x14".

Frame Rail Construction

The chassis frame shall utilize an integral torque box type design. The integral torque box shall combine the chassis frame and aerial torque box into a single structure. The integral torque box shall provide an optimized design that lowers vehicle center of gravity, eliminates the need to

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torque aerial frame attachment bolts, and permits under-slung outriggers to maximize body compartmentation.

The 20.5" high x 34.25" wide torque box shall be fabricated of 50,000-psi minimum yield, high strength, low alloy steel. The top and sides of the torque box frame shall be made of formed 9/16" thick plate with 1/2" bottom plates and 9/16" integral bulkhead supports. Certified welders shall construct the torque box. The design shall utilize 100% welded joints for a totally sealed box. Skip welding shall not be acceptable. Complete Finite Element Analysis and strain gauge testing shall be employed to verify minimum safety factors for road traveling (5:1) and aerial operation (2.5:1).

The completed torque box shall have the following attributes:

Resistance to bending moment 19,038,000 in. lbs.

Section modulus 380.76 cu. in.

The frame section immediately forward of the torque box shall have the following attributes:

Resistance to bending moment 4,948,000 in. lbs.

Section modulus 98.95 cu. in.

The torque box shall incorporate a stainless steel schedule 40 4" water pipe through the torque box for the aerial waterway discharge. In addition, the torque box shall have two- (2) 3" conduits full length to encapsulate the hydraulic, air and electrical lines.

The entire assembly shall be sand blasted and painted black before chassis assembly. The apparatus manufacturer shall supply a full lifetime warranty against defects in materials or workmanship.

The custom chassis frame shall have a wheel alignment in order to achieve maximum vehicle road performance and to promote long tire life. The alignment shall conform to the manufacturer's internal specifications. All wheel lug nuts and axle U-bolt retainer nuts shall be tightened to the proper torque at the time of alignment. The wheel alignment documentation shall be made available at delivery.

Front Axle/Suspension

The vehicle shall utilize an ArvinMeritor FL-943, 5" drop beam front axle with a rated capacity of 21,500 lbs. It shall have "easy steer" knuckle pin bushings and 68.83" kingpin centers. The axle shall be of I-beam construction and utilize grease-lubricated wheel bearings. The vehicle shall have a nominal crank angle of 45 degrees, plus two (+ 2) degrees to minus three (- 3) degrees including front suction applications.

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The front axle hubs shall be made from ductile iron and shall be designed for use with 10 whole hub-piloted wheels in order to improve wheel centering and extend tire life.

The front springs shall be parabolic tapered, minimum 4" wide x 54" long (flat), minimum three (3) leaf, progressive rate with bronze bushings and a capacity of 21,500 lbs. at the ground.

Tapered leaf springs provide a 20% ride improvement over standard straight spring systems. Supporting documentation/data shall be provided upon request.

The vehicle shall be equipped with a Sheppard integral model M-110 power steering gear, used in conjunction with a power assist cylinder. The steering assembly shall be rated to statically steer up to a maximum front axle load of 21,500 lbs. Relief stops shall be provided to reduce system pressure upon full wheel cut. The system shall operate mechanically should the hydraulic system fail.

A 2-year/unlimited miles parts and 2-year labor axle warranty shall be provided as standard by ArvinMeritor Automotive.

In order to achieve maximum vehicle road performance and to promote long tire life, there shall be a wheel alignment. The alignment shall conform to the manufacturer's internal specifications. All wheel lug nuts and axle U-bolt retainer nuts shall be tightened to the proper torque at the time of alignment. The wheel alignment documentation shall be made available at delivery.

The front suspension shall be furnished with two (2) heavy-duty, double acting shock absorbers, one (1) on each side.

Rear Axle/Suspension

The vehicle shall utilize an ArvinMeritor RT-50-160, 54,000 lb. capacity rear tandem axle with single reduction hypoid gearing.

The axle shall be equipped with oil-lubricated wheel bearings with ArvinMeritor oil seals.

A 2-year/unlimited miles parts and 2-year labor axle warranty shall be provided as standard by ArvinMeritor Automotive.

The vehicle shall be equipped with a Ridewell Dynalastic rear suspension. The suspension shall consist of center trunnions, compensators, elastomer springs, and independent torque arms. Cross tubes and torque rods shall also be provided to maintain proper alignment during cornering and to absorb driving and braking forces. The suspension shall be rated for the maximum axle capacity.

A 4-year pro-rated warranty shall be provided as standard.

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Front Wheels/Rims

The vehicle shall have two (2) polished (on outer wheel surfaces only) aluminum disc wheels. They shall be forged from one-piece corrosion-resistant aluminum alloy.

Rear Wheels/Rims

The vehicle shall have eight (8) polished (on outer wheel surfaces only) aluminum disc wheels. They shall be forged from one-piece corrosion-resistant aluminum alloy.

Front Tires

The front tires shall be two (2) Michelin 425/65R 22.5 tubeless type 20 PR radial tires with XTE2 highway tread.

The tires with wheels shall have the following weight capacity and speed rating:

21,000 lbs. @ 65 MPH.

The wheels and tires shall conform to the Tire and Rim Association requirements.

Rear Tires

The rear tires shall be Michelin 12R 22.5 tubeless type radial tires with XDN2 mud and snow tread.

The tires with wheels shall have the following weight capacity:

27,000 lbs. (dual) @ 75 MPH.

The wheels and tires shall conform to the Tire and Rim Association requirements.

Front Brakes

The front axle shall be equipped with ArvinMeritor 16-1/2" x 6" S-cam brakes with ArvinMeritor automatic slack adjusters.

A 3-year/unlimited miles parts and 3-year labor front brake warranty shall be provided as standard by ArvinMeritor Automotive. Warranty shall include bushings, seals, and cams.

Rear Brakes

The rear axle shall be equipped with ArvinMeritor 16-1/2" x 7" Q-Plus S-cam brakes with cast brake drums. The brakes shall be furnished with ArvinMeritor automatic slack adjusters

A 3-year/unlimited miles parts and 3-year labor rear brake warranty shall be provided as standard by ArvinMeritor Automotive. The warranty shall include bushings, seals, and cams.

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Brake System

The vehicle shall be equipped with air operated brake system. The system shall meet or exceed the design and performance requirements of current FMVSS-121 and test requirements of current NFPA 1901 Standard.

Each wheel shall have a separate integral brake chamber. A dual treadle valve shall split the braking power between the front and rear systems.

The air system shall be provided with a rapid build-up feature, designed to meet current NFPA 1901 requirements. A 1/4" brass quick-release air inlet with male connection shall be located inside the driver door on the left side of the cab. The inlet shall allow a shoreline air hose to be connected to the vehicle, discharging into the wet tank.

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

Two (2) air pressure needle gauges, for front and rear air pressure, with warning light and buzzer shall be installed at the driver's instrument panel.

One (1) reservoir shall serve as the wet tank and a minimum of one (1) tank shall be supplied for each of the front and rear axles. The total system shall carry a sufficient volume of air to comply with FMVSS-121.

The following tank sizes shall be installed:

Tank Sizes in Cubic Inches

Suspension	Wet	Front	Rear	Rear Extension	Total
34-52K	1738	1738	2988	0	6464
58K	1738	1738	2988	1738	8202

An automatic drain valve shall be installed on the wet tank. All other tanks shall be equipped with manual drain valves.

A Wabco ABS system shall be provided to improve vehicle stability and control by reducing wheel lock-up during braking. This braking system shall be fitted to axles and all electrical connections shall be environmentally sealed, water-, weather-, and vibration-resistant.

The system shall constantly monitor wheel behavior during braking. Sensors on each wheel transmit wheel speed data to an electronic processor, which shall sense approaching wheel lock and instantly modulate brake pressure up to five (5) times per second to prevent wheel lock-up.

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Each wheel shall be individually controlled. To improve field performance, the system shall be equipped with a dual circuit design. The system circuits shall be configured in a diagonal pattern. Should a malfunction occur, that circuit should revert to normal braking action? A warning light at the driver's instrument panel shall indicate malfunction to the operator.

The system shall consist of a sensor clip, sensor, electronic control unit, and solenoid control valve. The sensor clip shall hold the sensor in close proximity to the tooth wheel. An inductive sensor consisting of a permanent magnet with a round pole pin and coil shall produce an alternating current with a frequency proportional to wheel speed. The unit shall be sealed, corrosion-resistant and protected from electro-magnetic interference. The electronic control unit shall monitor the speed of each wheel sensor and a microcomputer shall evaluate in milliseconds wheel slip. A deviation shall be corrected by cyclical brake application and release. If a malfunction occurs, the circuit shall signal the operator and the malfunctioning half of the system shall shut down. The system is installed in a diagonal pattern for side-to-side control. The system shall ensure that each wheel is braked in optimum efficiency up to five (5) times a second.

The system shall also interface with the application of the auxiliary engine, exhaust, or driveline brakes to prevent wheel lock.

To improve service trouble-shooting, provisions in the system for an optional diagnostic tester shall be provided. The system shall test itself each time the vehicle is started and a dash-mounted light shall go out once the vehicle is moving above 4 MPH.

A 3-year/300,000 mile parts and labor Anti-Locking Braking System (ABS) warranty shall be provided as standard by Meritor Automotive.

Park Brake Release

One (1) Bendix-Westinghouse PP-1 parking brake control valve shall be supplied on the lower dash panel within easy reach of the driver.

Parking Brake Front Axle

A front axle parking brake system shall be provided. Utilizing a separate dash mounted activation switch, the system shall apply the front axle service brake. The system shall be interlocked to the main axle rear axle parking brake parking brake system control, so as to be operational only when the main system brakes are applied. A dash mounted warning tag shall be provided, stating; "Low air system pressure reduces or eliminates braking force."

Air Dryer

The chassis air system shall be equipped with a Bendix-Westinghouse AD-9 air dryer to remove moisture from the air in order to help prevent the air lines from freezing in cold weather and prolong the life of the braking system components.

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Air Inlet

A 1/4" brass quick-release air inlet with a male connection. The inlet shall allow a shoreline air hose to be connected to the vehicle, discharging air directly into the wet tank. It shall be located driver doorjamb.

Air Lines

Air-lines shall be constructed of color-coded nylon tubing routed in a manner to protect from damage. Brass fittings shall be provided.

Air Horns

Dual air horns shall be provided, connected to the chassis air system. The horns shall be mounted through the front bumper. The front bumper shall have two (2) holes punched to accommodate the horns. A pressure protection valve shall be installed to prevent the air brake system from being depleted of air pressure.

Engine/Transmission

Engine

The vehicle shall utilize a Cummins ISM electronic engine as described below:

- Charge Air Cooled (CAC) 4-cycle diesel
- Six (6) Cylinder
- Cummins Celect fuel system
- Fuel cooler (when equipped with a fire pump)
- 661 cu.in. displacement
- 500 gross BHP at 2100 RPM and a peak torque of 1550 lb.ft. at 1200 RPM
- Bore and stroke shall be 4.92 x 5.79
- Compression ratio shall be 17:1
- Engine lubrication system shall have a minimum capacity, to include filter, of 43 quarts
- Delco-Remy 39 MD-HD 12 volt starter
- Interacta System
- 18.7 cubic foot per minute air compressor
- Exhaust gas recirculation (**does not require particulate filter**)
- Ember separator compliant with 2003 NFPA 1901 requirements

The engine shall be compliant with 2007 EPA Emission standards

The engine air intake shall be through a grille located over the left-hand front wheel well where it is protected from direct frontal impingement by road debris, dust, road spray, and high water "bow wakes". The air cleaner shall be a 10" diameter Farr Eco-Lite with a replaceable element. Air cleaner intake piping shall be made from aluminized steel tubing with flexible rubber hoses. Air cleaner intake piping clamps shall be heavy-duty, constant-torque, T-bolt clamps to ensure proper sealing under all temperatures in order to keep dust and other contaminants out of the engine intake air stream and protect the engine.

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The engine exhaust piping shall be a minimum of 4" diameter welded aluminized steel tubing. The muffler shall be mounted horizontally under the right-hand frame rail in back of the cab in order to minimize heat transmission to the cab and its occupants. The exhaust shall be directed away from the vehicle on the right side ahead of the rear wheels in order to keep exhaust fumes as far away as possible from the cab and pump operator position.

A 5-year/100,000 miles parts and labor warranty will be provided as standard by Cummins.

A copy of the Engine Installation Review stating the engine installation meets Cummins recommendations shall be provided. The engine installation shall not require the operation of any type of "power-down" feature to meet engine installation tests.

Transmission

The vehicle shall utilize an Allison EVS4000P, electronic, 5-speed automatic transmission.

A push button shift module shall be located right side of the steering column, within easy reach of the driver. The shift position indicator shall be indirectly lit for after dark operation. The shift module shall have a "Do Not Shift" light and a "Service" indicator light. The shift module shall have means to enter a diagnostic mode and display diagnostic data. A transmission temperature gauge with warning light and buzzer shall be installed on the cab instrument panel.

The transmission shall have a gross input torque rating of 1675 lb. ft. and a gross input power rating of 580 HP.

The gear ratios shall be as follows:

1 - 3.51

2 - 1.91

3 - 1.43

4 - 1.00

5 - .74

R - 4.80

The transmission shall be equipped with a fluid level sensor (FLS) system, providing direct feedback of transmission oil level information to the operator.

The transmission shall have a lubricant capacity of 51 quarts.

Transmission oil cooler shall be provided in the lower tank of the radiator.

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The transmission shall contain two engine driven PTO openings located at the 1 and 8 o'clock positions. The automatic transmission shall be equipped with a power lock-up device. The transmission lock-up shall prevent down shifting of transmission when engine speed is decreased during pump operations, thereby maintaining a constant gear ratio. Transmission lock-up shall be automatically activated when placing pump in gear. Transmission lock-up shall be automatically deactivated when disengaging pump for normal road operation.

A 5-year/unlimited miles parts and labor warranty shall be provided as standard by Allison Transmission.

Transmission Selector

A push button shift module Allison model #29538373 shall be located right side of the steering column, within easy reach of the driver. The shift position indicator shall be indirectly lit for after dark operation. The shift module shall have a "Do Not Shift" light and a "Service" indicator light. The shift module shall have means to enter a diagnostic mode and display diagnostic data. A transmission temperature gauge with warning light and buzzer shall be installed on the cab instrument panel.

Transmission Fluid

The transmission fluid shall be Trans Synd synthetic.

Vehicle Speed

The apparatus shall have a speed range of between 62mph and 67mph.

Engine Cooling Package

The cooling system shall have a tube-and-fin radiator with a minimum of 1,362 square inches of frontal area to ensure adequate cooling under all operating conditions. The radiator shall have five (5) rows of brass tubes with sixteen (16) copper fins per inch, and bolted steel top and bottom tanks for durability and ease of repair. There shall be a drain valve in the bottom tank to allow the radiator to be serviced.

There shall be a coolant overflow recovery system provided.

All radiator and heater hoses shall be silicone. Pressure compensating band clamps shall be used to eliminate hose pinching on all hoses over 1".

The cooling system shall be filled with a 50/50 mixture of water and antifreeze/coolant conditioner to provide freezing protection to minus 40 (- 40) degrees F for operation in severe winter temperatures.

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The system shall include a charge air cooler with a minimum of 883 square inches of frontal area to ensure adequate cooling of the turbocharged air for proper engine operation and maximum performance. The charge air cooler core shall be 2.62" deep with seven (7) fins per inch.

Charge air cooler hoses shall be made from high-temperature wire-reinforced silicone to withstand the extremely high temperatures and pressures of the turbocharged air. The hoses shall incorporate a flexible hump section to allow motion and misalignment of the engine relative to the charge air cooler. Charge air cooler hose clamps shall be heavy-duty, constant-torque; T-bolt clamps to ensure proper sealing under all temperatures in order to keep dust and other contaminants out of the engine intake air stream and protect the engine.

The fan shall be 30" in diameter with eleven (11) blades for maximum airflow and dynamic balance. It shall be made of nylon for strength and corrosion resistance. A fan shroud attached to the radiator shall be provided to prevent recirculation of engine compartment air around the fan in order to maximize the cooling airflow through the radiator.

Jacobs Engine Brake

One (1) Jacobs model 490 engine brake shall be installed to assist in slowing and controlling the vehicle as required by NFPA 1901 for vehicles with gross vehicle weight ratings (GVWR) of 36,000 lbs. or greater. An on-off control switch and a high-low selector switch shall be mounted in the cab.

When activated, the Jacobs engine brake shall cut off the flow of fuel to the cylinders and alter the timing of the exhaust valves. This shall transform the engine into a high-pressure air compressor, driven by the wheels, and the horsepower absorbed by the engine in this mode shall slow the vehicle. The high-low selector switch allows the driver to select the amount of retarding power.

When the on-off switch is in the "on" position, the engine brake shall be automatically applied whenever the accelerator is in the idle position and the automatic transmission is in the lock-up mode. If the accelerator is depressed or if the on-off switch is placed in the "off" position, the engine brake shall immediately release and allow the engine to return to its normal function.

Fuel System

One (1) 65-gallon fuel tank shall be provided. The tank shall be stainless steel and shall conform to all applicable Administration (FHWA) 393.65 and 393.67 standards. The tank shall be mounted below the frame rails at the rear of the chassis for maximum protection. The tank shall be secured with two (2) wrap-around stainless steel straps. Each strap shall be fitted with protective rubber insulation and shall be secured with grade 8 hardware. This design allows for tank removal from below the chassis.

The fuel tank shall be equipped with a 2" diameter filler neck. The filler neck shall extend to the rear of the vehicle behind the rear tires and away from the heat of the exhaust system as required by NFPA 1901 Standard for Automotive Fire Apparatus. The open end of the filler neck shall be equipped with a twist-off filler cap with a retaining chain.

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The tank shall be plumbed with top-draw and top-return fuel lines in order to protect the lines from road debris. Bottom-draw and/or bottom-return fuel lines are not acceptable. A vent shall be provided at the top of the tank. The vent shall be connected to the filler neck to prevent splash back during fueling operations. A .50" NPT drain plug shall be provided at the bottom of the tank.

The tank shall have a minimum useable capacity of 65 gallons of fuel with a sufficient additional volume to allow for thermal expansion of the fuel without overflowing the vent.

A mechanical fuel pump shall be provided and sized by the engine manufacturer as part of the engine.

All fuel lines shall be rubber.

Fuel Reprime

An auxiliary 12-volt fuel pump shall be included in the fuel system. The electric pump shall permit repriming of the fuel lines and engine. The pump may be manually operated with a switch located on the cab dash. The electric pump shall also automatically operate in conjunction with the mechanical fuel pump as long as engine oil pressure is present. The system shall be plumbed to allow full flow to bypass the pump.

Fuel Shut-Off

A shut-off valve shall be supplied to prevent drain back of fuel into the main supply line during filter changes. The valve(s) shall be located: one (1) at fuel tank

Fuel/Water Separator

A Racor fuel/water separator shall be installed in place of the primary fuel filter on DDC engines, and in addition to the fuel filters on all other engine models. The unit shall utilize a three-step separate process: centrifuge for primary contaminant separation, conical baffles for water coalescing, and a replaceable filter for final particulate removal. The separator shall have a bottom drain for removing contaminants, shall be heated and shall have a rated maximum flow of 3.16 gpm. A sensor with indicator light and audible alarm shall be provided for the Racor fuel/water separator. The indicator light shall be mounted in the dash with the unit located inside the pump module. The unit will alert the driver of high water content in the separator bowl.

Drivelines

Drivelines shall have a heavy-duty metal tube and shall be equipped with Spicer 1810 series universal joints to allow full-transmitted torque to the axle(s). Drive shafts shall be axially straight, concentric with axis and dynamically balanced.

Front Tow Eyes

Two (2) 3/4" thick heavy-duty steel tow eyes shall be securely attached to the chassis frame rails at the front of the apparatus. They shall be mounted in the downward position.

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Rear Tow Eyes

Two (2) heavy-duty tow eyes made of 3/4" (0.75") thick steel having 2.5" diameter holes shall be bolted directly to the rear of the frame to allow towing (not lifting) of the apparatus. The tow eyes shall be protruding into the rear compartment or out the rear of the body. The tow eyes shall be painted chassis black.

Power Take-Off

Power take-off for the automatic transmission shall be a 6 bolt mounted hydraulic shift with a switch located in the cab. Hydraulic shift will allow the PTO to be shifted while the unit is in motion and without having to shut down the water pump.

400 AMP Alternator

There shall be a 400 amp Niehoff alternator installed as specified.

The alternator shall be a 385 amps, per NFPA 1901 rating (400 amp per SAE J56), Niehoff model C712-1 brushless type with internal rectifier. The unit shall have an adjustable remote mounted solid-state voltage regulator.

Battery System

The manufacturer shall supply four (4) heavy-duty Group 31 12-volt maintenance-free batteries. Each battery shall be installed and positioned so as to allow easy replacement of any single battery. Each battery shall be equipped with carrying handles to facilitate ease of removal and replacement. There shall be two (2) steel frame-mounted battery boxes, one (1) on the left frame rail and one (1) on the right frame rail. Each battery box shall be secured to the frame rail with Grade 8 hardware. Each battery box shall hold (2) batteries. The batteries shall have a minimum combined rating of 4,000 (4 x 1000) cold cranking amps (CCA) @ 0 degrees Fahrenheit and 820 (4 x 205) minutes of reserve capacity for extended operation. The batteries shall have 3/8-16 threaded stud terminals to ensure tight cable connections. The battery stud terminals shall each be treated with concentrated industrial soft-seal after cable installation to promote corrosion prevention. The positive and negative battery stud terminals and the respective cables shall be clearly marked to ensure quick and mistake-proof identification.

Batteries shall be placed on non-corrosive rubber matting and secured with hold-down brackets to prevent movement, vibration, and road shock. The hold-down bracket J-hooks shall be cut to fit and shall have all sharp edges removed. The batteries shall be placed in plastic trays to provide preliminary containment should there be leakage of hazardous battery fluids. There shall be two (2) plastic trays, each containing (2) batteries. Each battery tray shall be equipped with a rubber vent hose to facilitate drainage. The rubber vent hose shall be routed to drain beneath the battery box. The batteries shall be positioned in well-ventilated areas.

Batteries shall have a warranty of twelve (12) months that shall commence upon the date of delivery of the apparatus.

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Cab

The vehicle shall have an all-welded aluminum, fully enclosed tilt cab designed exclusively for the fire service to ensure long life. It shall incorporate a welded substructure of high-strength aluminum alloy extrusions that surrounds and protects the perimeter of the occupant compartment for increased safety.

The cab shall be constructed from 3/16" (0.188") 3003 H14 aluminum alloy plate roof, floor, and outer skins welded to a high-strength 6063-T6 aluminum alloy extruded sub frame. Wall supports and roof bows are 6061 T6 aluminum alloy. This combination of a high-strength, welded aluminum inner structure surrounded on all sides by load-bearing, welded aluminum outer skins provides a cab that is strong, lightweight, corrosion-resistant, and durable.

The inner structure shall be designed to create an interlocking internal "roll-cage" effect by welding two (2) 3" x 3" x 0.188" wall-thickness 6063-T5 aluminum upright extrusions between the 3" x 3" x 0.375" wall-thickness 6061-T6 roof crossbeam and the 2.25" x 3" x 0.375" wall-thickness 6063-T6 sub frame structure in the front. An additional two (2) aluminum upright extrusions within the back-of-cab structure shall be welded between the rear roof perimeter extrusion and the sub frame structure in the rear to complete the interlocking framework. The four (4) upright extrusions -- two (2) in the front and two (2) in the rear -- shall be designed to effectively transmit roof loads downward into the sub frame structure to help protect the occupant compartment from crushing in a serious accident. All joints shall be electrically seam welded internally using aluminum alloy welding wire.

The sub frame structure shall be constructed from high-strength 6061-T6 aluminum extrusions welded together to provide a structural base for the cab. It shall include a side-to-side C-channel extrusion across the front, with 3/4" x 2-3/4" (.75" x 2.75") full-width crossmember tubes spaced at critical points between the front and rear of the cab.

The cab floor shall be constructed from 3/16" (0.188") 3003 H14 smooth aluminum plate welded to the sub frame structure to give the cab additional strength and to help protect the occupants from penetration by road debris and under-ride collision impacts.

The cab roof shall be constructed from 3/16" (0.188") 3003 H14 aluminum treadplate supported by a grid of fore-aft and side-to-side aluminum extrusions to help protect the occupants from penetration by falling debris and downward-projecting objects. Molded fiberglass or other molded fiber-reinforced plastic roof materials are not acceptable.

The cab roof perimeter shall be constructed from 4" x 6-5/8" (4" x 6.625") 6063-T5 aluminum extrusions with integral drip rails. Cast aluminum corner joints shall be welded to the aluminum roof perimeter extrusions to ensure structural integrity. The roof perimeter shall be continuously welded to the cab roof plate to ensure a leak-free roof structure.

The cab rear skin shall be constructed from 3/16" (0.188") 3003 H14 aluminum plate. Structural extrusions shall be used to reinforce the rear wall.

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The left-hand and right-hand cab side skins shall be constructed from 3/16" (0.188") 3003 H14 smooth aluminum plate. The skins shall be welded to structural aluminum extrusions at the top, bottom, and sides for additional reinforcement.

The cab front skins shall be constructed from 3/16" (0.188") 3003 H14 smooth aluminum plate. The upper portion shall form the windshield mask, and the lower portion shall form the cab front. Each front corner shall have a full 9" outer radius for strength and appearance. The left-hand and right-hand sides of the windshield mask shall be welded to the left-hand and right-hand front door frames, and the upper edge of the windshield mask shall be welded to the cab roof perimeter extrusion for reinforcement. The cab front shall be welded to the sub frame C-channel extrusion below the line of the headlights to provide protection against frontal impact.

Cab Exterior

The exterior of the cab shall be 94" wide x 130" long to allow sufficient room in the occupant compartment for up to eight (8) fire fighters. The cab roof shall be approximately 101" above the ground with the flat roof option. The back-of-cab to front axle length shall be a minimum of 58".

Front axle fenderette trim shall be brushed aluminum for appearance and corrosion resistance. Bolt-in front wheel well liners shall be constructed of 3/16" (0.188") composite material to provide a maintenance-free, damage-resistant surface that helps protect the underside of the cab structure and components from stones and road debris.

A large stainless steel cooling air intake grille with an open area of no less than 81% shall be at the front of the cab.

The cab windshield shall be of a two-piece replaceable design for lowered cost of repair. The windshield shall be made from 1/4" (0.25") thick curved, laminated safety glass with a 75% light transmittance automotive tint. A combined minimum viewing area of 2,700-sq. in. shall be provided. Forward visibility to the ground for the average (50th percentile) male sitting in the driver's seat shall be no more than 11 feet 7 inches from the front of the cab to ensure good visibility in congested areas.

Cab door assist handrails shall consist of two (2) 1.25" diameter x 18" long 6063-T5 anodized aluminum tubes mounted directly behind the driver and officer rear door openings each side of the cab. The handrails shall be machine extruded with integral ribbed surfaces to assure a good grip for personnel safety. Handrails shall be installed between chrome end stanchions and shall be positioned at least 2" from the mounting surface to allow a positive grip with a gloved hand.

The rear cab wall shall be constructed with the use of 3/16" aluminum diamond plate interlocking in aluminum extrusions.

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Cab Mounts and Cab Tilt System

The cab shall be independently mounted from the body and chassis to isolate the cab structure from stresses caused by chassis twisting and body movements. Mounting points shall consist of two (2) forward-pivoting points, one (1) on each side; two (2) intermediate rubber load-bearing cushions located midway along the length of the cab, one (1) on each side; and two (2) combination rubber shock mounts and cab latches located at the rear of the cab, one (1) on each side.

An electric-over-hydraulic cab tilt system shall be provided to provide easy access to the engine. It shall consist of two (2) large-diameter, telescoping, hydraulic lift cylinders, one (1) on each side of the cab, with a frame-mounted electric-over-hydraulic pump for cylinder actuation.

Safety flow fuses (velocity fuses) shall be provided in the hydraulic lift cylinders to prevent the raised cab from suddenly dropping in case of a burst hydraulic hose or other hydraulic failure. The safety flow fuses shall operate when the cab is in any position, not just the fully raised position.

The hydraulic pump shall have a manual override system as a backup in the event of an electrical failure. Lift controls shall be located in a compartment to the rear of the cab on the right side of the apparatus. A parking brake interlock shall be provided as a safety feature to prevent the cab from being tilted unless the parking brake is set.

The entire cab shall be tilted through a 42-45 degree arc to allow for easy maintenance of the engine, transmission and engine components. A positive-engagement safety latch shall be provided to lock the cab in the full tilt position to provide additional safety for personnel working under the raised cab.

In the lowered position, the cab shall be locked down by two (2) automatic, spring-loaded cab latches at the rear of the cab. A "cab ajar" indicator light shall be provided on the instrument panel to warn the driver when the cab is not completely locked into the lowered position.

Cab Interior

The interior of the cab shall be of the open design with an ergonomically designed driver area that provides ready access to all controls as well as a clear view of critical instrumentation.

The engine cover between the driver and the officer shall be a low-rise contoured design to provide sufficient seating and elbow room for the driver and the officer. The engine cover shall blend in smoothly with the interior dash and flooring of the cab. An all-aluminum sub frame shall be provided for the engine cover for strength. The overall height of the engine enclosure shall not exceed 23" from the floor at each side and 27" in the center section. The engine cover shall not exceed 41" in width at its widest point.

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The rear portion of the engine cover shall be provided with a lift-up section to provide easy access for checking transmission fluid, power steering fluid, and engine oil without raising the cab. The engine cover insulation shall consist of 3/4" dual density fiberglass composite panels with foil backing manufactured to specifically fit the engine cover without modification to eliminate "sagging" as found with foam insulation. The insulation shall meet or exceed DOT standard MVSS 302-1 and V-0 (UI subject 94 Test).

Externally, the engine cover is a molded 18 lb/cu.ft (+/-0.5) flexible integral skinned polyurethane foam at a Durometer of 60 (+/- 5.0) per ASTM F1957-99 and with a minimum skin thickness of 0.0625 inches and shall be provided to reduce the transmission noise and heat from the engine. There shall be molded integral armrests provided for both the driver and the officer as well as large cup holders.

All cab floors shall be covered with a black rubber floor mat that provides an aggressive slip-resistant surface in accordance with current NFPA 1901.

The rear cab floor shall be modified to provide clearance for the power take off and hydraulic pump. The top of the box shall be covered with rubber floor matting to match the rest of the cab.

A minimum of 57.25" of floor-to-ceiling height shall be provided in the front seating area of the cab and a minimum of 55.25" floor-to-ceiling height shall be provided in the rear seating area. A minimum of 40" of seated headroom shall be provided over each fenderwell.

The floor area in front of the front seat pedestals shall be no less than 20.5" side to side by 25.0" front to rear for the driver and no less than 20.5" side to side by 26.0" front to rear for the officer to provide adequate legroom.

Battery jumper studs shall be provided to allow jump-starting of the apparatus without having to tilt the cab.

All exposed interior metal surfaces shall be pretreated using a corrosion prevention system.

The interior of the cab shall be insulated to ensure the sound (dbA) level for the cab interior is within the limits stated in the current edition of NFPA 1901. The insulation shall consist of 2 oz. wadding and 1/4" (0.25") foam padding. The padding board shall be backed with 1/4" (0.25") thick reflective insulation. The backing shall be spun-woven polyester. Interior cab padding shall consist of a rear cab headliner, a rear wall panel, and side panels between the front and rear cab doors.

All surfaces subject to repeated contact and wear -- the dash, overhead console, windshield posts, headliner, door panels, and door post trim -- shall be covered with thermoformed, non-metallic, non-fiber trim pieces or panels to provide excellent scuff and abrasion resistance, as well as chemical stain resistance. The thermoformed material shall comply with Federal Motor Vehicle Safety Standard (FMVSS) 302 for flammability of interior materials.

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The vehicle shall use a seven-position tilt and telescopic steering column to accommodate various size operators. An 18" padded steering wheel with a center horn button shall be provided.

A full-width overhead console shall be mounted to the cab ceiling for placement of siren and radio heads, and for warning light switches. The console shall be made from a thermoformed, non-metallic material and shall have easily removable mounting plates.

Storage areas, with hinged access doors, shall be provided below the driver and officer seats. The driver side compartment shall be approximately 20" x 12" x 3.5" high and the officer side compartment shall be approximately 20.25" x 22.75" x 11" high.

The front cab steps shall be a minimum of 8" deep x 24" wide. The first step shall be no more than 24.0" above the ground with standard tires in the unloaded condition per NFPA 1901 standards. The rear cab steps shall be a minimum 12" deep x 21" wide. The first step shall be no more than 24.0" above the ground with standard tires in the unloaded condition per NFPA 1901 standards. The rear steps shall incorporate intermediate steps for easy access to the cab. The steps are to be located inside the doorsill, where they are protected against mud, snow, ice, and weather. The step surfaces shall be aluminum diamond plate with a multi-directional, aggressive gripping surface incorporated into the aluminum diamond plate in accordance with current NFPA 1901.

A black rubber grip handle shall be provided on the interior of each front door below the door window to ensure proper hand holds while entering and exiting the cab. An additional black rubber grip handle shall be provided on the left and right side windshield post for additional handholds.

Driver and officer door windows shall have the support pillar located toward the front of the window. There shall be a vent that can be opened and closed within the window itself, located towards the front. The front and rear windows of the cab shall be electrically operated to rise and lower.

Fixed glass windows shall be supplied on either side of the cab, providing visibility at the rear. The windows shall be approximately 4" wide and approximately the same height as the door windows.

There shall be a sliding window provided on the driver and officer's side between the front and rear cab doors.

The inner door panels shall be made from 14 gauge brushed finish stainless steel for increased durability. The cab door panels shall incorporate an easily removable panel for access to the latching mechanism for maintenance or service.

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The cab rear doors shall be moved to the rear of the wheel opening. This door placement facilitates easier entry and egress by reducing the rear facing seat protrusion into the door opening.

Each cab door shall have a stainless steel trim on the trailing edge of the door opening.

Cab instrument panel, overhead console, trim panels, headliner, and door panels shall be gray.

Padded sun visors shall be provided for the driver and officer matching the interior trim of the cab and shall be flush mounted into the underside of the overhead console.

Cab Doors

There shall be reflective signs on each cab door in compliance with all NFPA requirements.

Four (4) side-opening cab doors shall be provided. Doors shall be constructed of a 3/16" (0.188") aluminum plate outer material with an aluminum extruded inner framework to provide a structure that is as strong as the side skins.

Front cab door openings shall be approximately 36" wide x 71.5" high, and the rear cab door openings shall be approximately 33.75" wide x 73" high. The front doors shall open approximately 75 degrees, and the rear doors shall open approximately 80 degrees.

The doors shall be securely fastened to the doorframes with full-length, stainless steel piano hinges, with 3/8" (0.375") diameter pins for proper door alignment, long life, and corrosion resistance. Mounting hardware shall be treated with corrosion-resistant material prior to installation. For effective sealing, an extruded rubber gasket shall be provided around the entire perimeter of all doors.

Stainless steel paddle-style door latches shall be provided on the interiors of the doors. The latches shall be designed and installed to protect against accidental or inadvertent opening as required by NFPA 1901.

The front door windows shall provide a minimum viewing area of 530 sq. in. each. The rear door windows shall provide a minimum viewing area of 500 sq. in. each. All windows shall have 75% light transmittance automotive safety tint. Full roll-down windows shall be provided for the front cab doors with worm gear drive cable operation for positive operation and long life. Scissors or gear-and-sector drives are not acceptable.

All cab doors shall have "L" style exterior door latches.

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Cab Instruments and Controls

Two (2) pantograph-style windshield wipers with two (2) separate electric motors shall be provided for positive operation. Air-operated windshield wipers are not acceptable because of their tendency to accumulate moisture, which can lead to corrosion or to freezing in cold weather. The wipers shall be a wet-arm type with a one (1) gallon washer fluid reservoir, an intermittent-wipe function, and an integral wash circuit. Wiper arm length shall be approximately 28", and the blade length approximately 20". Each arm shall have a 70-degree sweep for full coverage of the windshield.

An in-dash mounted heater and defroster with a minimum capacity of 42,000 Btu/hr and all necessary controls shall be mounted in the cab. The airflow system shall consist of three (3) levels, defrost, cab, and floor, and shall have fresh air and defogging capabilities.

Cab controls shall be located on the cab instrument panel in the dashboard on the driver's side where they are clearly visible and easily reachable. Emergency warning light switches shall be installed in removable panels for ease of service. The following gauges and/or controls shall be provided:

- Master battery switch/ignition switch (rocker with integral indicator)
- Starter switch/engine stop switch (rocker)
- Heater and defroster controls with illumination
- Marker light/headlight control switch with dimmer switch
- Self-canceling turn signal control with indicators
- Windshield wiper switch with intermittent control and washer control
- Master warning light switch
- Transmission oil temperature gauge
- Air filter restriction indicator
- Pump shift control with green "pump in gear" and "o.k. To pump" indicator lights
- Parking brake controls with red indicator light on dash
- Automatic transmission shift console
- Electric horn button at center of steering wheel
- Cab ajar warning light on the message center enunciator

Controls and switches shall be identified as to their function by backlit wording adjacent to each switch, or indirect panel lighting adjacent to the controls.

Fast Idle System

A fast idle system shall be provided and controlled by the cab-mounted or pump panel-mounted switch. The system shall increase engine idle speed to a preset RPM for increased alternator output. (The cab dash has a position for the switch by default, if the switch is to be located on the pump panel it must be annotated in "Location".)

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Electrical System

The cab and chassis system shall have a centrally located electrical distribution area. All electrical components shall be located such that standard operations shall not interfere with or disrupt vehicle operation. An automatic thermal-reset master circuit breaker compatible with the alternator size shall be provided. Automatic-reset circuit breakers shall be used for directional lights, cab heater, battery power, ignition, and other circuits. An access cover shall be provided for maintenance access to the electrical distribution area.

A 6 place, constantly hot, and 6-place ignition switched fuse panel and ground for customer-installed radios and chargers shall be provided at the electrical distribution area. Radio suppression shall be sufficient to allow radio equipment operation without interference.

All wiring shall be mounted in the chassis frame and protected from impact, abrasion, water, ice, and heat sources. The wiring shall be color-coded and functionally labeled every 3" on the outer surface of the insulation for ease of identification and maintenance. The wiring harness shall conform to SAE 1127 with GXL temperature properties. Any wiring connections exposed to the outside environment shall be weather-resistant. All harnesses shall be covered in a loom that is rated at 280 degrees F to protect the wiring against heat and abrasion.

A Vehicle Data Computer (VDC) shall be supplied within the electrical system to process and distribute engine and transmission Electronic Control Module (ECM) information to chassis system gauges, the message center, and related pump panel gauges. Communications between the VDC and chassis system gauges shall be through a 4 wire multiplexed communication system to ensure accurate engine and transmission data is provided at the cab dash and pump. The VDC shall be protected against corrosion, excessive heat, vibration, and physical damage.

Two (2) dual rectangular sealed beam halogen headlights shall be installed on the front of the cab, one (1) on each side, mounted in a polished chrome-plated bezel. The low beam headlights shall activate with the release of the parking brake to provide daytime running lights (DRL) for additional vehicle conspicuity and safety. The headlight switch shall automatically override the DRL for normal low beam/high beam operation.

Cab Roof Notch

The cab roof shall be notched front to rear of the cab to minimize overall travel height of the vehicle. The cab roof notch shall not affect the interior cab ceiling or cab structure.

Cab Step Area Lighting

There shall be four (4) clear incandescent lights provided to illuminate the cab step well area. Each light shall be located on each cab door in the inboard position. The cab door ajar circuit shall activate each light.

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Air Conditioning

An overhead air-conditioner / heater system with a single roof mounted condenser shall be supplied.

The unit shall be mounted to the cab interior headliner in a mid cab position, away from all seating positions. The unit shall provide ten (10) comfort discharge louvers, four (4) to the back area of the cab and six (6) to the front. These louvers will be used for AC and heat air delivery. Two (2) additional large front louvers shall be damper controlled to provide defogging and defrosting capabilities to the front windshield as necessary.

The unit shall consist of a high output evaporator coil and heater core with one (1) high output dual blower for front air delivery, and two (2) high performance single wheel blowers for rear air delivery.

A serviceable filter shall be installed on the A/C evaporator. The filter shall consist of a steel perimeter frame with a foam filter.

The control panel shall actuate the air-distribution system with air cylinders, which are to be separated from the brake system by an 85-90 psi pressure protection valve. A three-speed blower switch shall control air speed.

The condenser shall be roof mounted and have a minimum capacity of 65,000 BTU's and have dual fans with a built in receiver drier.

Performance Data: (Unit only, no ducting or louvers)

AC BTU: 55,000

Heat BTU: 65,000

CFM : 950 @ 13.8V (All blowers)

The compressor shall be a ten-cylinder swash plate type Seltec model TM-31HD with a capacity of 19.1 cu.in. Per revolution.

The system shall be capable of cooling the interior of the cab from 100 degrees ambient to 75 degrees or less with 50% relative humidity in 30 minutes or less.

Cab Mirrors

Two (2) Velvac model 2010 heated, remote controlled, stainless steel mirrors with marker lights shall be installed. The west coast style mirrors shall consist of a large 7" x 16" flat and 4" x 6" wide angle convex with stainless steel breakaway mounts. The adjustment of the main sections of the mirror and the heater control shall be through dash-mounted switches.

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Front Mud Flaps

Black linear low-density polyethylene (proprietary blend) mud flaps shall be installed on the rear of the cab front wheelwells. The design of the mud flap shall have corrugated ridges to distribute water evenly.

Seating

All seats shall be 911 brand, gray vinyl fabric.

One (1) Seats Inc. 911 electric seat with high back styling shall be supplied for the driver's position.

Features shall include:

- Removable "Store-All" side cushions.
- Power Fore/Aft
- Power Height Adjust
- Power Seat Tilt
- Manual back Recline
- Built in lumbar support.
- Replaceable seat, side and headrest cushions.

One (1) Seats, Inc. 911 Universal fixed SCBA seat shall be supplied for the officer's position in front of the cab to the right of the driver's position.

Features shall include:

- Universal styling.
- High back seat back.
- Built-in back and lumbar adjustment.
- Easy exit, flip up, and split headrest for improved exit with SCBA.

One (1) Seats, Inc. 911 Universal SCBA seat shall be provided in the rear facing position over the driver side wheel well.

Features shall include:

- Universal styling.
- High back seat back.
- Easy exit, flip up, and split headrest for improved exit with SCBA.

One (1) Seats, Inc. 911 Universal SCBA seat shall be provided in the rear facing position over the officer side wheel well.

Features shall include:

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- Universal styling.
- High back seat back.
- Easy exit, flip up, and split headrest for improved exit with SCBA.

Two (2) Seats, Inc. 911 Universal SCBA seat backs and a two (2) person bench style seat bottom with a single cushion shall be mounted on the rear wall of the cab. Each side of the seat riser shall be angled, providing sufficient legroom while entering and exiting the cab.

Features shall include:

- Universal styling
- Easy exit, flip up, and split headrest for improved exit with SCBA.
- Bench cushion shall be constructed of high-density foam with a heavy-duty wear resistant material.

Seating Capacity Tag

A tag that is in view of the driver stating seating capacity of six (6) personnel shall be provided.

Storage Under Bench Seat

There shall be two vertically hinged doors provided on the sides of the seat risers enabling access to store equipment below the rear wall bench seat.

Map Box

An aluminum map/storage box shall be installed in the cab. The map box shall be constructed of 1/8" (.125) smooth aluminum. A hinged cover, with a push button latch, shall be provided for access to the storage area. The storage area shall be divided into three (3) equal sections. The latch shall have a 50 lb. rating. An ABS mounting surface shall be provided for recess mounting of radio heads, or other items as specified by the department.

The map box shall be mounted in the center front of the cab between the driver and officer seating positions. The map box shall be secured and tested to meet with current N.F.P.A. requirements.

Approximate Dimensions:

Storage area with lid - 11"L x 13.5"W x 12.25" deep.

Mounting surface - 8.5"L x 13.5" W x 12.25" deep.

Cab Dome Lights

A dome light assembly with two (2) LED's - one (1) white lens and one (1) red lens and plastic housing shall be installed. The white light activates with appropriate cab door and light assembly mounted push-button switch, the red light activates with light assembly mounted push-button switch only.

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There shall be two (2) mounted in the front of the cab, one (1) in the driver and one (1) in the officer ceiling.

There shall be two (2) mounted in the rear of the cab, one (1) in the driver side and one (1) in the officer side ceiling.

Air Compressor and Battery Conditioner

A Supersmart microprocessor controlled battery charging system shall be installed and Kussmaul Auto Pump 120.

The Battery Charging system shall have a 110 volt 60 hertz input with a 20-amp DC output.

The system shall provide a signal by a remote charge indicator panel. If battery voltage drops below 11.5 volts, the remote panel shall be located next to the auto-eject receptacle.

The microprocessor is continuously powered from the battery to provide charge status. Equalization charge only occurs when necessary, not with every cycle.

The system will fully charge batteries while allowing up to 8 amps of parasitic load.

The air compressor shall be a Kussmaul O91-9B-1 powered by 120-volt 60-Hertz input from the auto-eject receptacle with an output of .76 cfm at 100 psi. Includes a miniature air filter with transparent bowl and pressure switch that senses the system pressure and operates the compressor whenever the pressure in the air brake system drops below a predetermined level.

Battery Charger Receptacle

A 20-amp battery charger receptacle shall be installed in the specified location.

The receptacle shall be located outside driver's door next to handrail

The cover color shall be Yellow

Switch Horn Button Three Position

A three (3) position rocker switch shall be installed in the cab and properly labeled to enable operator to activate one of the following from the steering wheel horn button: OEM Traffic horn; air horn or Federal Signal Q2B.

English Dominant Gauge Cluster

The cab operational instruments shall be located in the dashboard on the driver side of the cab and shall be clearly visible. The gauges in this panel shall be English dominant and shall be the following:

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- Speedometer/Odometer
- Tachometer with integral hour meter
- Engine oil pressure gauge with warning light and buzzer
- Engine water temperature gauge with warning light and buzzer
- Two (2) air pressure gauges with a warning light and buzzer (front air and rear air) • Fuel gauge
- Voltmeter
- Transmission oil temperature gauge

This panel shall be backlit for increased visibility during day and night time operations.

Cab Turn Signals

There shall be a pair of Whelen 600 LED (Light Emitting Diode) turn signal light heads with populated arrow pattern and amber lens mounted upper headlight bezel and wired with weatherproof connectors.

Headlights

The front of the cab shall have four (4) headlights. The headlights shall be mounted on the front of the cab in the lower position. The headlights shall be daytime operational.

12 Volt Outlet in Cab

A plug-in type receptacle for hand held spotlights; cell phones, chargers, etc. shall be installed driver side dash, officer side dash. The receptacle shall be wired battery hot.

12 Volt Bar

A 12-volt (6 battery/6 ignition) bar shall be located behind the officer's seat for department-supplied equipment.

Aerial Equipment Body

Performance

The aerial body shall be designed to permit the reloading of fire hose without raising the aerial from the stored position. This requirement is essential to the effective operation of the apparatus when pumper operations are required.

The apparatus body shall be constructed entirely of aluminum extrusions with interlocking aluminum plates. An extruded modular aluminum body is required due to the high strength-to-weight ratio of aluminum, corrosion-resistant body structure, easy damage repair, and lighter overall body weight to allow for increased equipment carrying capacity.

The apparatus shall incorporate a rescue style body design to maximize compartment space. The rescue style left and right side body shall combine upper and lower compartments to provide more efficient use of body storage capacity.

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The entire vehicle shall be constructed of aluminum extrusions. Body designs that incorporate steel sub-frames connected to aluminum compartments are not as corrosion-resistant and not acceptable.

Body Mainframe

The body mainframe shall be entirely constructed of aluminum. The complete framework shall be constructed of 6061T6 and 6063T5 aluminum alloy extrusions welded together using 5356 aluminum alloy welding wire.

The mainframe shall incorporate a series of vertical frame components connected in series. Each vertical frame assembly shall be constructed with 3" x 3" extrusions welded together in a square frame configuration. The open center shall permit the installation of a tunnel for ground ladder storage. The mainframe shall be held together from front to rear by two (2) solid 1/2" x 3" aluminum braces on each side of the vertical frame components. The braces shall also serve as the connection point between the torque box and body frame. The body side compartments shall be connected and supported by the extruded aluminum mainframe assembly.

Body Side Assemblies

The left and right side body assemblies shall be framed with 6063T5 1 1/2" x 4" 3/16" wall extrusions. The left side body compartments shall be framed to make full height compartments ahead and behind the wheel well opening. The body side assemblies shall be designed so that the compartment walls are not required to support the body. The compartments shall be interlocked and welded to the side assembly extrusions.

The top of the body side assemblies shall be supplied with embossed diamond plate covers with polished corners to minimize maintenance and provide service access to electrical components.

Stabilizer Openings

The body shall be designed to accommodate a four (4) stabilizer aerial system. One (1) opening shall be supplied behind the rear axle as close to the wheel well opening as possible to maximize rear angle of departure and to prevent the stabilizer pads from contacting the ground during driving. The second set shall be mounted just behind the pump compartment. The openings shall be framed in aluminum extrusions. A stabilizer cover made from treadplate shall be supplied on the extendable stabilizer. The cover shall provide a pleasing appearance and mounting location for a red stabilizer warning light as outlined in NFPA 1901 20.21.4.4.

The stabilizer openings shall be supplied with clear lights to illuminate the stabilizers and the ground surrounding the openings. The lights shall illuminate when any stabilizer is moved from the stored position.

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Body Mounting System

The body shall attach to the integral torque box with grade 8 bolts connected through steel mounts welded on the side of the torque box. To isolate dissimilar metals a 1/4" fiber-reinforced rubber dielectric barrier between the aluminum body and steel torque box shall be supplied. Body designs that weld to the aerial torque box or chassis frame rails shall not be acceptable due to the stress imposed on the vehicle during road travel and aerial operations.

Rear Body Design

The rear body shall be designed to provide ground ladder storage, hose deployment, and service access to aerial components. The center rear of the body shall be open for ground ladder storage. The area below the ground ladder storage shall be for a waterway inlet (if applicable), the stabilizer control panel and have access doors to hydraulic components.

The aerial master control panel that is located on the rear of the body shall consist of a master switch; interlock light, and indicators that illuminate when each stabilizer is deployed. The stabilizer controls shall be divided into two (2) boxes located one (1) each side on the rear body so the operator may observe the stabilizers being deployed on each side of the apparatus as outlined in NFPA 1901.

Side Aerial Access Staircase

A single access staircase shall be supplied on the driver's side of the apparatus to the aerial turntable. The staircase shall incorporate a pocket-style drop-down step in the body rubrail to reduce ground to staircase step height when the unit is up on jacks. The angled staircase shall be supplied with extruded aluminum handrails on both sides of the staircase frame.

Water Tank Mounting System

The body design shall allow the booster tank to be completely removable without disturbing or dismounting the apparatus body structure. The water tank shall rest on top of a 3" x 3" frame assembly covered with rubber shock pads and corner braces formed from 3/16" angled plate to support the tank.

The booster tank mounting system shall utilize a floating design to reduce stress from road travel and vibration. To maintain low vehicle center of gravity, the water tank bottom shall be mounted within 5" of the frame rail top. Designs that store ground ladders under the water tank and raise center of gravity shall not be acceptable.

Compartments

All body compartment walls and ceilings shall be constructed from 1/8" formed aluminum 3003 H14 alloy plate. Each compartment shall be modular in design and shall not be part of the body support structure.

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Compartment floors shall be constructed of 1/8" aluminum diamond plate welded in place. Compartment floors that are over 15" deep shall be supported by a minimum 1.5" x 3" x 1/8" walled aluminum extrusions. The compartment seams shall be sealed using a permanent pliable silicone caulk. A series of louvers shall be supplied to facilitate ventilation of each compartment. Each louver shall be 3" wide by 3/4" tall and 1/2" deep.

Handrails

Access handrails shall be provided at all step positions, including, but not limited to, the rear corner tailboard and installed to NFPA 1901 15.8. All body handrails shall be constructed of maintenance-free, corrosion-resistant, extruded aluminum. Handrails shall be a minimum of 1.25" OD and shall be installed between chrome end stanchions at least 2" from the mounting surface to allow for access with a gloved hand. The extruded aluminum shall be ribbed to assure a good grip for personnel safety.

The handrails shall be installed as follows:

Two (2) 48" handrails, one (1) each side, located on the aerial access staircase.

Steps, Standing, and Walking Surfaces

The maximum stepping distance shall not exceed 18", with the exception of the ground to first step. The ground to first step shall not exceed 24". The ground to first step shall be maintained when the stabilizers are deployed by an auxiliary set of steps installed at the aerial access staircase. All steps or ladders shall sustain a minimum static load of 500 lbs. without deformation as outlined in NFPA 15.7.2.

All exterior steps shall be designed with an average slip resistance of .68 when wet as measured with an English XL tester following ASTM F 1679 (Standard Test Method for Using a Variable Incidence Tribometer).

Apparatus Warning Labels

A label shall be supplied on the rear body to warn personnel that riding in or on the rear step is prohibited as outlined in NFPA 1901 15.7.4. A label shall be applied to both sides of the apparatus and the rear to warn operators that the aerial is not insulated.

Rubrail

The body shall have a rubrail along the length of the body on each side and at the rear. The rubrail shall be constructed of minimum 3/16" thick anodized aluminum 6463T6 extrusion. The rubrail shall be a minimum of 2.75" high x 1.25" deep and shall extend beyond the body width to protect compartment doors and the body side.

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The rubrail shall be of a C-channel design to allow marker and warning lights to be recessed inside for protection. The top surface of the rubrail shall have a minimum of five (5) serrations raised .1" high with cross grooves to provide a slip-resistant edge for the rear step and running boards. The rubrail shall be spaced away from the body using 3/16" nylon spacers. The ends of each section shall be provided with a rounded corner piece. The area inside the rubrail C-channel shall be inset with a reflective material for increased side and rear visibility.

Pump Compartment

The pump operator's control panel and pump compartment shall be located at the front of the body. The operator's controls and gauges shall be located on the left side (street side) of the apparatus. The compartment shall be designed following NFPA 1901 15.6.

A side running board formed from 1/8" aluminum diamond plate shall be provided and shall extend the full length of the pump module on each side of the apparatus. The running board shall be bolted to the pump compartment for rigidity and to provide easy removal for replacement in the case of damage.

Hosebed Capacity

The aerial hosebed shall be designed to carry up to 500' 5" LDH.

The hosebed shall be located on the right side of the apparatus and contain 22 cubic feet. The hosebed shall measure 22" deep by 17" wide and 100" long.

The hosebed compartment deck shall be constructed entirely from maintenance free, extruded aluminum. Extrusions shall have an anodized ribbed top surface for maintenance free service life. The aluminum slats shall be a combination of 3/4" x 2-3/4" and 3/4" x 7-1/2" extrusions riveted into a one-piece grid system to prevent the accumulation of water and allow ventilation to assist in drying hose. The hosebed compartment shall be free of sharp edges and projections to prevent hose damage. The compartment deck design shall incorporate a track for the installation of adjustable hosebed dividers. The track shall hold the nut straight, so only a Philip's head screwdriver is required to adjust the divider from side to side.

The inboard hosebed side shall consist of 3/16" aluminum plate welded, from the backside, into a framework of 3" x 3" x 3/16" and 1-1/2" x 3" x 3/16" aluminum slotted extrusions. The plate shall be welded both vertically and horizontally for high rigidity. The outboard hosebed side shall be double wall construction. The outer body wall shall be constructed of 1-1/2" x 4" x 3/16" aluminum extrusions with 3/16" aluminum plate welded flush with the outer surface. The 3/16" outer plate shall be re-inforced with 1" x 1-1/2" 3/16" aluminum extrusions for rigidity. A .090 aluminum plate liner shall be installed to prevent damage to the outer painted body side from hose couplings.

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Rear Body Platework

The rear body platework shall be 1/8" aluminum diamond plate.

Side Mount Pump Panels

The driver and officer side pump panels shall be constructed of 14-gauge stainless steel. Each panel shall have the ability to be removed from the module for easier access and for maintenance in the pump area.

Pump Access Door

The officer side pump module shall include an upper horizontally hinged pump access door.

The door shall be constructed of 3/16" (.187") aluminum treadplate. The compartment door shall be securely attached with a full-length stainless steel piano type hinge with 1/4" pins. The hinge shall be "staked" on every other knuckle to prevent the pin from sliding. The door shall include two (2) push-button style latches to secure the door in the closed position and two (2) hold-open devices to hold the door in the open position.

Pump Panel Tags

Color-coded pump panel labels shall be supplied to be in accordance with NFPA compliance, and shall match the department's existing color-coding as closely as possible.

Pump Panel Air Outlet With Hose

A 1/4" female air hose fitting shall be mounted on the pump panel with a 1/4" snubber valve. The fitting and valve shall be connected to the air reservoir tank. 25' of 1/4" air hose with one (1) 1/4" male and one (1) 1/4" female air fitting shall be supplied.

Location: driver's side pump panel

Air Horn Switch

A heavy duty, weatherproof, push button switch shall be installed at the pump operator's panel on the driver's side to operate the air horns. The switch shall be labeled "Evacuation Alert".

Dunnage Pan

A dunnage pan constructed of 3/16" (.188") aluminum treadplate shall be located rearward of the crosslays. The dunnage pan shall be sized to maximize available storage space.

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Ladder Tunnel Doors

A pair of 1/8" (.125) aluminum diamond plate doors with D-ring style handles shall be installed for access to the rear ladder tunnel. Each door shall open a full 90 degrees to allow easy removal of ground ladders.

Rear Pike Pole Storage

Pike poles storage shall be provided at the rear of the body for six (6) pike poles. The storage area shall be labeled for two (2) 6' poles, two (2) 8' poles, and two (2) 12' poles. The pike poles shall be secured by either "J" slotted locking tubes and/or hinged door(s) that match the rear body finish.

Auxiliary Ground Pads

Four (4) auxiliary ground pads shall be provided. The pads shall be 26" x 26" x 1/2" thick aluminum plate with a grab handle welded to the edge. The pads shall be stored in double brackets that are mounted each side below the body ahead of the rear drop down jacks.

Upper Dunnage Area Extension

The upper dunnage area shall be provided with an extension to increase its storage capacity. The extension shall be approximately 34" long x 58" wide tapering in height from 12.75" at the front to 8" high across the rear. Coupled with the body's integral open storage area of 36" long x 55" wide x 14" deep, the upper dunnage area contains approximately 27 cu. ft. of open storage space. The walls of the dunnage area extension shall be constructed of aluminum diamond plate.

Outrigger Covers

Two (2) piece outrigger covers constructed of .125" aluminum tread plate shall be provided for the jack leg openings. One piece of the cover shall be sized to cover just the extending outrigger in order to require a minimal amount of set-up space. The second piece of the cover shall be fixed and mounted to the body to cover the remaining outrigger opening.

Rear Ladder Storage

A ladder storage tunnel shall be provided beneath the aerial device framework. There shall be access to the ladders via an opening at the rear.

The ladders will be held captive top and bottom by aluminum tracks and slide on friction reducing material. All ladders shall be removable individually without having to remove any

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other ladder. The tunnel that extends into the pump compartment shall be fully enclosed so debris will not accumulate in the tunnel.

The ladder tunnel shall hold: (2) PEL-35, PEL-28, PEL-24, PRL-20, PRL-16 and FL-10.

Slide-Out Platform

The slide-out platform shall be 21" deep and shall be constructed of 1/8" aluminum tread brite. The platform shall be mounted under the apparatus body. The platform shall utilize a maintenance-free slide system incorporating stainless steel shoulder bolts that slide in slotted heavy wall aluminum angles. Notches shall be provided at each end of the slots to hold the platform in both the extended and retracted positions.

A chrome grab handle shall be provided on the front face of the platform for ease of operation.

The NFPA pump throttle height requirement shall be measured from the top of the slide out platform on all aerials and from the ground on side mounted pump operator panels on non-aerial apparatus.

Location: below driver side pump panel

Folding Steps

Heavy-duty folding step(s) shall be located driver side front compartment face. The folding step(s) shall meet current NFPA in step height and surface area.

One (1) handrail shall be installed in compliance with current NFPA. The handrail shall be constructed of 6063T5 1.25" OD anodized aluminum tube, with an integral ribbed surface to assure a good grip for personnel safety, mounted between chrome stanchions.

Intermediate Pump Panel Step

An intermediate pump panel step with two (2) lower and one (1) upper folding step with one (1) handrail shall be provided.

The intermediate step shall be constructed of 3/16" (.187") aluminum treadplate. The step shall include a multi-directional, aggressive gripping surface incorporated into the treadplate. The surface shall extend vertically from the diamond plate sheet a minimum of 1/8" (.125"). Gripping surfaces shall be circular in design, a minimum of 1" diameter and on centers not to exceed 4". The step shall be bolted onto the pump module and be easily removable for replacement in the case of damage.

One (1) 4" recessed mounted light shall be provided on the officer side front compartment face. The light shall be positioned above the step to provide illumination of the upper surface of the step.

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Heavy-duty folding steps shall be positioned two (2) below and one (1) above the intermediate step. The folding steps shall meet current NFPA in step height and surface area.

One (1) handrail shall be installed in compliance with current NFPA. The handrail shall be constructed of 6063T5 1.25" OD anodized aluminum tube, with an integral ribbed surface to assure a good grip for personnel safety, mounted between chrome stanchions.

Fuel Fill

A recessed fuel fill shall be provided at the driver side rear wheel well area.

Stainless Steel Trim

A stainless steel trim shall be located at the bottom edge of compartment L1, L2, L3, L4, L5, R1, R2, R3, R4, R5, R6 opening. The trim shall provide added protection of painted surface of the body when equipment is removed from the compartment.

Rear Mud Flaps

The rear tires shall have a set of black mud flaps mounted behind the rear chassis wheels.

Body Wheel Well

The body wheel well frame shall be constructed from 6063-T5 aluminum extrusion with a slot the full length to permit an internal fit of 1/8" (0.125") aluminum treadplate. The wheel well trim shall be constructed from 6063-T5 formed aluminum extrusion. The wheel well liners shall be constructed of a 3/16" (.187") composite material. The liners shall be bolt on and shall provide a maintenance-free and damage-resistant surface.

Body Compartments

Driver Side

The driver's side of the body shall have extended height rescue style compartments and provide 120.62 cubic feet of storage, which exceeds the minimum NFPA 1901 Chapter 8.5 requirement of 40 cubic feet.

There shall be one (1) compartment (L1) over the forward stabilizers with a Robinson painted roll-up door. The compartment shall be approximately 31" wide x 28" high x 17" deep (upper) and 31" wide x 29" high x 14" deep (lower) and contain approximately 15.82 cubic feet of storage space. The door opening shall be approximately 31" wide x 57" high.

There shall be one (1) compartment (L2) behind the forward stabilizers with a Robinson painted roll-up door. The compartment shall be approximately 48" wide x 14.5" high x 17" deep (upper)

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and 48" wide x 54.5" high x 25.5" deep (lower) and contain approximately 45.45 cubic feet of storage space. The door opening shall be approximately 48" wide x 69" high.

There shall be one (1) compartment (L3) over rear wheels with a horizontally hinged lift-up door. The compartment shall be approximately 50.5" wide x 18" high x 26" deep and contain approximately 13.68 cubic feet of storage space. The door opening shall be approximately 50.5" wide X 18" high.

There shall be one (1) compartment (L4) over rear wheels with a horizontally hinged lift-up door. The compartment shall be approximately 52.5" wide x 18" high x 20" deep and contain approximately 10.94 cubic feet of storage space. The door opening shall be approximately 52.5" wide x 18" high.

There shall be one (1) compartment (L5) over the rear stabilizer with a Robinson painted roll-up door. The compartment shall be approximately 69.5" wide x 13" high x 18" deep (upper), 18" wide x 29.5" high x 23" deep (lower forward), 34" wide x 29.5" high x 14" deep (lower center), 17.5" wide x 29.5" high x 23" deep (lower rearward) and contain approximately 31.48 cubic feet of storage space. The door opening shall be approximately 69.5" wide x 42.5" high.

There shall be one (1) compartment (L6) down low ahead of the rear stabilizer with a horizontally hinged single pan door constructed of the same material / finish as the body wheelwells. The compartment shall be approximately 15.5" wide x 8" high x 23" deep and contain approximately 1.65 cubic feet of storage space. The door opening shall be approximately 15.5" wide x 8" high.

There shall be one (1) compartment (L7) down low behind the rear stabilizer with a horizontally hinged single pan door constructed of the same material / finish as the body wheelwells. The compartment shall be approximately 15" wide x 8" high x 23" deep and contain approximately 1.60 cubic feet of storage space. The door opening shall be approximately 15" wide x 8" high.

Officer Side

The officer's side of the body shall have extended height rescue style compartments ahead of the rear wheel with a single high side compartment ahead of the hosebed to provide 102.23 cubic feet of storage.

There shall be one (1) compartment (R1) over the forward stabilizers with a Robinson painted roll-up door. The compartment shall be approximately 31" wide x 28" high x 16" deep (upper) and 31" wide x 29" high x 14" deep (lower) and contain approximately 15.32 cubic feet of storage space. The door opening shall be approximately 31" wide x 57" high.

There shall be one (1) compartment (R2) behind the forward stabilizers with a Robinson painted roll-up door. The compartment shall be approximately 48" wide x 14.5" high x 16" deep (upper) and 48" wide x 54.5" high x 26" deep (lower) and contain approximately 45.80 cubic feet of storage space. The door opening shall be approximately 48" wide x 69" high.

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There shall be one (1) compartment (R3) over rear wheels horizontally hinged lift-up door. The compartment shall be approximately 50.5" wide x 18" high x 26" deep and contain approximately 13.68 cubic feet of storage space. The door opening shall be approximately 50.5" wide X 18" high.

There shall be one (1) compartment (R4), ahead of the rear stabilizer with a Robinson painted roll-up door. The compartment shall be approximately 15.5" wide x 32.5" high x 23" deep and contain approximately 6.71 Cubic feet of storage space. The door opening shall be approximately 15.5" wide x 32.5" high.

There shall be one (1) compartment (R5), over the rear stabilizer with a vertically hinged door. The compartment shall be approximately 31" wide x 20.5" high x 14" deep and contain approximately 5.15 Cubic feet of storage space. The door opening shall be approximately 31" wide x 20.5" high.

There shall be one (1) compartment (R6), behind the rear stabilizer with a Robinson painted roll-up door. The compartment shall be approximately 36" wide x 32.5" high x 23" deep and contain approximately 15.57 Cubic feet of storage space. The door opening shall be approximately 36" wide x 32.5" high.

A ROM drip pan shall be supplied for each roll-up door. The drip pan shall be made from a high strength aluminum alloy. The splashguard and end caps shall be made from extruded and injection molded high-impact plastic.

All vertically or horizontally hinged single compartment doors shall be constructed using a box pan configuration. The outer door pan shall beveled and shall be constructed from 3/16" (0.188") aluminum plate. The inner door pan shall be constructed from 1/8" (0.125") smooth aluminum plate and shall have nutsert fittings to attach hold-open hardware. The inner pan shall have a 95-degree bend to form an integral drip rail.

The compartment door shall have a 1" x 9/16" (1" x 0.43") closed-cell "P" EPDM sponge gasket meeting ASTM D-1066 2A4 standards installed around the perimeter of the door to provide a seal that is resistant to oil, sunlight, and ozone.

A drain hole shall be installed in the lower corner of the inside door pan to assist with drainage.

A polished stainless steel Hansen D-ring style twist-lock door handle with #459 latch shall be provided on the door. The 4-1/2" (4.5") D-ring handle shall be mounted directly to the door latching mechanism with screws that do not penetrate the door material for improved corrosion resistance.

The compartment door shall be securely attached to the apparatus body with a full-length stainless steel 1/4" (0.25") rod piano-type hinge isolated from the body and compartment door with a dielectric barrier. The door shall be attached with machine screws threaded into the doorframe. The door shall have a gas shock-style hold-open device.

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An anodized aluminum drip rail shall be mounted over the compartment opening to assist in directing water runoff away from the compartment.

Crosslay and Hosebed Covers

The crosslay and hosebed covers shall be aluminum with black vinyl flaps.

SCBA Storage

Eight (8) SCBA bottle storage compartments shall be provided. The compartments shall be 8" diameter by 25" deep and located four (4) each side in the body wheel well area.

Each SCBA bottle shall be held in place by a hinged cast aluminum door with a positive latch and shall include an inner door seal for increased protection against the elements.

The inner SCBA storage tube shall be made of high strength polyethylene to provide additional protection to the surface of the SCBA bottles.

Tank Fill

One (1) 2.5" pump-to-tank fill line having a manually operated 2.5" Akron valve. The valve control shall be located at the pump operator's panel and shall visually indicate the position of the valve at all times. The valve shall be controlled with a chrome handle.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position and water is flowing through it.

The valve shall be of the unique Akron Swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

Tank to Pump

One (1) manually operated 3" Akron valve shall be installed between the pump suction and the booster tank in order to pump water from the tank. The valve control shall be located at the pump operator's panel and shall visually indicate the position of the valve at all times.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position and water is flowing through it.

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The valve shall be of the unique Akron Swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

Booster Tank

The booster tank shall be T-shaped in configuration and shall have a capacity of 300 gallons. All tank sides, top and bottom, shall be constructed of 1/2" black UV stabilized copolymer polypropylene.

The tank shall be constructed utilizing latest thermo plastic welding technology. A clean, hot air controlled temperature process shall ensure that the weld reaches its plasticized state without cold or hot spots.

The tank shall undergo extensive testing prior to installation in the truck. The process shall include an electronic spark and waterfill test after both the internal and external tank shell welds are completed.

The tank shall have a combination vent and manual fill tower. The tower shall be located in the left front corner of the tank. The tank overflow shall be 4" diameter. The tower shall have a hinged cover and 1/4" thick polypropylene screen.

There shall be two (2) standard tank openings; one for the tank to pump suction line with an anti-swirl plate and one for a tank fill line.

Baffles, both longitudinal and latitudinal shall be interlocking and thermo welded to minimize water surge during travel, enhancing road-handling stability. Openings in the baffles shall be positioned to allow waterflow to NFPA standards during filling or pumping operations.

The tank shall be mounted on hard rubber cushions to isolate the tank from road shock and vibration. The tank shall be completely removable without disturbing or dismounting the apparatus body structure.

A lifetime manufacturer's limited warranty shall be included.

Triple Crosslay Hosebed

Three (3) crosslay hosebeds shall be provided at the front area of the body. Two (2) crosslay sections shall have a capacity for up to 200' of 1.75" double-jacket hose and one (1) shall have a capacity up to 200' of 2.5" double-jacket hose single stacked and preconnected to the pump discharge. The crosslay decking shall be constructed entirely of maintenance-free 3/4" x 2-3/4" hollow aluminum extrusions.

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Stainless steel rollers with nylon guides set in aluminum extrusions shall be installed horizontally and vertically on each end of the crosslay to allow easy deployment of the hose and help protect the body paint.

Pump System

The pump shall be a midship-mounted Hale QMAX single stage centrifugal pump. The pump shall be mounted on the chassis frame rails and shall be split-drive driven.

The entire pump body and related parts shall be of fine grain alloy cast iron, with a minimum tensile strength of 30,000 psi (207 MPa). All metal moving parts in contact with water shall be of high quality bronze or stainless steel. Pump body shall be horizontally split in two sections, for easy removal of impeller assembly including wear rings and bearings from beneath the pump without disturbing pump mounting or piping.

The pump impeller shall be hard, fine grain bronze of the mixed flow design and shall be individually ground and hand balanced. Impeller clearance rings shall be bronze, easily renewable without replacing impeller or pump volute body, and of wrap-around double labyrinth design for maximum efficiency.

The pump shaft shall be heat-treated, corrosion-resistant stainless steel and shall be rigidly supported by three (3) bearings for minimum deflection. The sleeve bearing is to be lubricated by a force fed, automatic oil lubricated design, pressure-balanced to exclude foreign material. The remaining bearings shall be heavy-duty, deep groove ball bearings in the gearbox and shall be splash-lubricated. Pump shaft must be sealed with double-lip oil seal to keep road dirt and water out of the gearbox.

Two (2) 6.0" diameter suction ports with 6" NST male threads and removable screens shall be provided, one each side. The ports shall be mounted one (1) on each side of the midship pump and shall extend through the side pump panels. Inlets shall come equipped with long handle chrome caps.

Discharge Manifold

The pump system shall utilize a stainless steel discharge manifold system that allows a direct flow of water to discharge valves. The manifold and fabricated piping systems shall be constructed of a minimum of Schedule 10 stainless steel to reduce corrosion.

The apparatus manufacturer shall provide a full 10-year stainless steel plumbing components warranty. This warranty shall cover defects in materials or workmanship of apparatus manufacturer designed foam/water plumbing system stainless steel components for 10 years. A copy of the warranty document shall be provided with the proposal.

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Priming System

The electrically driven priming pump shall be a positive displacement vane type. One (1) priming control, located at the pump operator's position, shall open the priming valve and start the priming motor. The primer shall be oil-less type. The priming valve shall be electronically interlocked to the "Park Brake" circuit to allow priming of the pump before the pump is placed in gear.

Pump Shift

The pump shift shall be pneumatically controlled using a power-shifting cylinder.

The power shift control valve shall be mounted in the cab and be labeled "PUMP SHIFT". The apparatus transmission shift control shall be furnished with a positive lever, preventing accidental shifting of the chassis transmission.

A green indicator light shall be located in the cab and be labeled "PUMP ENGAGED". The light shall not activate until the pump shift has completed its full travel into pump engagement position.

A second green indicator light shall be located in the cab and be labeled "OK TO PUMP". This light shall be energized when both the pump shift has been completed and the chassis automatic transmission has obtained converter lockup (4th gear lockup).

System

Two (2) test plugs shall be pump panel-mounted for third party testing of vacuum and pressures of the pump.

A master drain valve shall be installed and operated from the pump operator's panel. The master pump drain assembly shall consist of a Class 1 bronze master drain with a rubber disc seal and turning handle.

The manual Master Drain Valve shall have six (6) individually sealed ports that allow quick and simultaneous draining of multiple intake and discharge lines. It shall be constructed of corrosion-resistant material and be capable of operating at a pressure of up to 600 psi.

The master drain shall provide independent ports for low point drainage of the fire pump and auxiliary devices.

Gearbox Cooler

A gearbox cooler shall be provided to maintain safe operating temperatures during prolonged pumping operations.

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Auxiliary Engine Cooler

An engine cooler used to lower engine water temperature during prolonged pumping operations and controlled at the pump operator's panel shall be provided.

The engine cooler shall be installed in the engine coolant system in such a manner as to allow cool pump water to circulate around engine water, thus forming a true heat exchanger action. Cooler inlet and outlet shall be continuous, preventing intermixing of engine coolant and pump water.

Pump Rating

The pump shall be rated at 2000 GPM.

Pump Certification

The pump, when dry, shall be capable of taking suction and discharging water in accordance with current NFPA 1901. The pump shall be tested at the manufacturer's facility by an independent, third party testing service. The conditions of the pump test shall be as outlined in current NFPA 1901.

The tests shall include, at a minimum, the pump test, the pumping engine overload test, the pressure control system test, the priming device tests, the vacuum test, and the water tank to pump flow test as outlined in current NFPA 1901.

A piping hydrostatic test shall be performed as outlined in current NFPA 1901.

The pump shall deliver the percentage of rated capacities at pressures indicated below:

100% of rated capacity at 150 psi net pump pressure
100% of rated capacity at 165 psi net pump pressure
70% of rated capacity at 200 psi net pump pressure
50% of rated capacity at 250 psi net pump pressure

A test plate, installed at the pump panel, shall provide the rated discharges and pressures together with the speed of the engine as determined by the certification test, and the no-load governed speed of the engine.

A Certificate of Inspection certifying performance of the pump and all related components shall be provided at time of delivery. Additional certification documents shall include, but not limited to, Certificate of Hydrostatic Test, Electrical System Performance Test, Manufacturer's Record of Pumper Construction, and Certificate of Pump Performance from the pump manufacturer.

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Pump Seal Packing

The pump shaft shall have only one (1) packing gland located on the inlet side of the pump. It shall be of split design for ease of repacking. The packing gland shall be of a design to exert uniform pressure on packing and to prevent cocking and uneven packing load when tightened. The packing rings shall be permanently lubricated, graphite composition and have sacrificial zinc foil separators to protect the pump shaft from galvanic corrosion.

The packing shall be easily adjusted by hand with rod or screwdriver with no special tools or wrenches required.

Steamers

The pump 6" Steamer/Intake(s) shall be mounted approximately 1" from the pump panel to back of cap when installed. The "Flush+1" dimension can vary + or - 1 1/4" or as practicable depending on the pump module width and options selected.

Relief Valve System

The pump shall be equipped with a Hale TPM single pressure monitoring and control system that will provide a safety release for excess pressure on the suction and discharge sides of the pump. An internal circulating valve shall be provided to handle small pressure fluctuations while larger surges shall be dumped to the ground. A pressure control valve shall be mounted on the pump panel.

Engine Throttle

Fire Research ThrottleXcel engine throttle and monitoring display shall be installed at the pump operator's panel. The case shall be waterproof and have dimensions not to exceed 6 3/4" high by 4 5/8" wide by 1 3/4" deep. The engine throttle control knob shall be 2" in diameter with a serrated grip, with a red idle push button in the center, and no mechanical stops. Inputs for engine information shall be from a J1939 databus, other inputs shall be 12 volts DC or from independent sensors.

The engine RPM shall be set to idle when the pump engaged interlock signal is recognized regardless of the throttle control knob position. Optical technology shall be used to detect the direction and speed that the control knob rotated for RPM control.

The following continuous displays shall be provided:

- Engine RPM; shown with four daylight bright LED digits more than 1/2" high, updated in 10 RPM increments
- Engine oil pressure; shown on an LED bar graph display in 10 psi increments
- Engine coolant temperature; shown on an LED bar graph display in 10 degree increments
- Battery voltage; shown on an LED bar graph display in 0.5 volt increments
- Time and date; shown on a dot matrix message display
- Interlock; OK TO PUMP LED is green to indicate throttle ready.

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A dot-matrix message display shall show diagnostic and warning messages as they occur. It shall show monitored apparatus information, stored data, and program options when selected by the operator. Operator selections and inputs shall be via push buttons on the front panel.

The program shall store the accumulated operating hours for the pump and engine, previous incident hours, and current incident hours in a non-volatile memory. Stored elapsed hours shall be displayed at the push of a button. The program shall have calibration and self-diagnostic capabilities. It shall monitor inputs and support audible and visual warning alarms for the following conditions:

- Low Oil Pressure
- High Engine Coolant Temperature
- High Transmission Temperature
- Low Battery Voltage (Engine Off)
- Low Battery Voltage (Engine Running)
- High Battery Voltage
- High Engine RPM

The engine throttle and monitoring display shall be programmed at installation for a specific engine.

Anodes

The Zinc anodes help prevents damage caused by galvanic corrosion within the pump. The system provides a sacrificial metal, which helps to diminish or prevent pump and pump shaft galvanic corrosion. One anode will be located on the suction side and one will be located on the discharge side of the pump.

Left Intake

One (1) 2 1/2" suction inlet with a manually operated 2 1/2" Akron valve shall be provided on the left side of the apparatus at the pump panel.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position and water is flowing through it.

The valve shall be of the unique Akron Swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

The outlet of the valve shall be connected to the suction side of the pump with the valve body located behind the pump panel. The valve shall come equipped with a brass inlet strainer, 2 1/2" NST female chrome inlet swivel and shall be equipped with a chrome-plated, rocker-lug plug with a retainer device.

The valve control shall be located at the pump operator's panel and shall visually indicate the position of the valve at all times.

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All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance, and decreased friction loss. A 3/4" bleeder valve assembly will be installed on the left side pump panel.

1.5 Single Crosslays

Two (2) single crosslay discharges shall be provided at the front area of the body. The crosslays shall include one (1) 2" brass swivel with a 1-1/2" hose connection to permit the use of hose from either side of the apparatus.

The crosslay hosebed shall consist of a 2" heavy-duty hose coming from the pump discharge manifold to the 2" swivel. The hose shall be connected to a manually operated 2" Akron valve. The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position and water is flowing through it.

The valve shall be of the unique Akron Swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

The valve control shall be located at the pump operator's panel and shall visually indicate the position of the valve at all times.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance, and decreased friction loss.

2.5 Single Crosslay

One (1) single crosslay discharge shall be provided at the front area of the body. The crosslay shall have one (1) 2-1/2" mechanical swivel hose connection to permit the use of the hose from either side of the apparatus.

The crosslay hosebed shall consist of a 2.5" heavy-duty hose coming from the pump discharge manifold to the 2.5" swivel. The hose shall be connected to a manually operated 2.5" Akron valve. The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position and water is flowing through it.

The valve shall be of the unique Akron Swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

The valve control shall be located at the pump operator's panel and shall visually indicate the position of the valve at all times.

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All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance, and decreased friction loss.

2.5" Left Discharges

Two (2) 2-1/2" discharge outlets with manually operated Akron valves shall be provided at the left hand side pump panel.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position and water is flowing through it.

The valve shall be of the unique Akron Swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

The valve control shall be located at the pump operator panel and shall visually indicate the position of the valve at all times.

The discharge shall extend out beyond the pump panel with a chrome-plated 30-degree downward angle with chrome-plated 2-1/2" NST threads to help prevent kinking of the discharge hose. The 30-degree droop shall be an integral part of the discharge valve and shall be equipped with a chrome-plated rocker-lug cap with a retainer chain.

The discharge shall be supplied with a 3/4" bleeder valve assembly. The bleeder valve shall be installed to drain water from the gauge pressure line to prevent freezing of the line. The drain shall be controlled with a quarter-turn valve on the pump panel.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

2.5" Right Discharge

One (1) 2-1/2" discharge outlet with a manually operated Akron valve shall be provided at the right side pump panel.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position and water is flowing through it.

The valve shall be of the unique Akron Swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

The valve control shall be located at the pump operator panel and shall visually indicate the position of the valve at all times.

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The discharge shall extend out beyond the pump panel with a chrome-plated 30-degree downward angle with chrome-plated 2-1/2" NST threads to help prevent kinking of the discharge hose. The 30-degree droop shall be an integral part of the discharge valve and shall be equipped with a chrome-plated rocker-lug cap with a retainer chain.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

4" Right Panel Discharge

One (1) 4" discharge outlet with a 3" manually operated Akron valve shall be provided at the right side pump panel. The discharge shall consist of a 3" valve connected to a 3" FNST x 4" MNST flash chrome adapter. The adapter shall protrude through the pump panel. The end of the discharge adapter shall be equipped with a chrome-plated, rocker-lug cap with a retainer chain.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position and water is flowing through it.

The valve shall be of the unique Akron Swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

The valve control shall be located at the pump operator panel and shall visually indicate the position of the valve at all times.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

4" Waterway Discharge

One (1) 4" diameter discharge outlet with an electrically operated Akron valve shall be connected from the pump to the aerial waterway.

The valve shall be an Akron 8840E HD series with a bronze flat ball design for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the brass ball when in a throttle position and water is flowing through it.

The valve shall be of the unique Akron Swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

The 8840E series valve shall have the following features:

- 12 volt DC motor
- A toggle switch and indicator lamp assembly mounted on the pump operator's panel.

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- Red, yellow and green valve position indicator lights
- Valve open and close "Auto Travel"
- Manual override valve actuation

The valve controls and indicators shall be located at the pump operator panel.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

Bleeder Drain Valves

All discharges shall be supplied with a 3/4" bleeder valve assembly. The bleeder valve shall be installed to drain water from the gauge pressure line to prevent freezing of the line. The drain shall be controlled with a quarter-turn valve on the pump panel.

Plumbed to: front bumper discharge, waterway discharge, crosslay preconnect, left discharge, right discharge

Tank Level Gauge

Fire Research TankVision model WL2000 water tank volume indicator kit shall be installed. The kit shall include an electronic indicator module, a pressure sensor, and a 12' sensor cable. The indicator shall show the volume of water in the tank on nine (9) easy to see super bright LEDs. A wide view lens over the LEDs shall provide for a viewing angle of 180 degrees. The indicator case shall be waterproof, manufactured of aluminum, and have a distinctive blue label.

The program features shall be accessed from the front of the indicator module. The program shall support self-diagnostics capabilities, self-calibration, and a data link to connect remote indicators. Low water warnings shall include flashing LEDs at 25%, down chasing LEDs when the tank is almost empty, and an output for an audio alarm.

The indicator shall receive an input signal from an electronic pressure sensor. The sensor shall be mounted on the outside of the water tank near the bottom-no probe shall place on the interior of the tank. Wiring shall be weather resistant and have automotive type plug-in connectors.

Multiplex Electrical System

The following specifications describe the low voltage electrical system on the specified fire apparatus. The electrical system shall include all panels, electrical components, switches and relays, wiring harnesses and other electrical components. The electrical equipment installed by the apparatus manufacturer shall conform to current automotive electrical system standards, the latest Federal DOT standards, and the requirements of the applicable NFPA #1901 standards.

The apparatus shall have multiplexing system, to provide diagnostic capability. The system shall have the capability of delivering multiple signals via a CAN bus, utilizing specifications set forth by SAE J1939. The electrical system shall be pre-wired for computer modem accessibility to

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allow service personnel to easily plug in a modem to allow remote diagnostics, troubleshooting, or program additions.

For superior system integrity, the networked system shall meet the following minimum requirement components:

- Power management center
- Load shedding power management
- Solid-state circuitry
- Switch input capability
- Responsible for lighting device activation
- Self-contained diagnostic indicators
- Power distribution module

All wiring shall be stranded copper or copper alloy conductors of a gauge rated to carry 125 percent of the maximum current for which the circuit is protected. Voltage drops in all wiring from the power source to the using device shall not exceed 10 percent. The wiring and wiring harness and insulation shall be in conformance to applicable SAE and NFPA standards. The wiring harness shall conform to SAE J-1128 with GXL temperature properties. All exposed wiring shall be run in a loom with a minimum 289 degree Fahrenheit rating. All wiring looms shall be properly supported and attached to body members. The electrical conductors shall be constructed in accordance with applicable SAE standards, except when good engineering practice requires special construction.

The wiring connections and terminations shall use a method that provides a positive mechanical and electrical connection and shall be installed in accordance with the device manufacturer's instructions. Electrical connections shall be with mechanical type fasteners and large rubber grommets where wiring passes through metal panels.

The wiring between the cab and body shall be split using Deutsche type connectors or enclosed in a terminal junction panel area. This system will permit body removal with minimal impact on the apparatus electrical system. All connections shall be crimp-type with heat shrink tubing with insulated shanks to resist moisture and foreign debris such as grease and road grime. Weather-resistant connectors shall be provided throughout to ensure the integrity of the electrical system.

Any electrical junction or terminal boxes shall be weather-resistant and located away from water spray conditions. In addition, the main body junction panel shall house the automatic reset breakers and relays where required.

There shall be no exposed electrical cabling, harnesses, or terminal connections located in compartments, unless they are enclosed in an electrical junction box or covered with a removable electrical panel. The wiring shall be secured in place and protected against heat, liquid contaminants and damage. Wiring shall be uniquely identified at least every two feet (2') by color-coding or permanent marking with a circuit function code and identified on a reference chart or electrical wiring schematic per requirements of applicable NFPA #1901 standards.

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The electrical circuits shall be provided with low voltage over current protective devices. Such devices shall be accessible and located in required terminal connection locations or weather-resistant enclosures. The over current protection shall be suitable for electrical equipment and shall be automatic reset type and meet SAE standards. All electrical equipment, switches, relays, terminals, and connectors shall have a direct current rating of 125 percent of maximum current for which the circuit is protected. The system shall have electro-magnetic interference suppression provided as required in applicable SAE standards.

The electrical system shall include the following:

- a) Electrical terminals in weather-exposed areas shall have a non-conductive grease or spray applied. A corrosion preventative compound shall be applied to all terminal plugs located outside of the cab or body.
- b) The electrical wiring shall be harnessed or be placed in a protective loom.
- c) Heat shrink material and sealed connectors shall be used to protect exposed connections.
- d) Holes made in the roof shall be caulked with silicone. Large fender washers shall be used when fastening equipment to the underside of the cab roof.
- e) Any electrical component that is installed in an exposed area shall be mounted in a manner that will not allow moisture to accumulate in it.
- f) A coil of wire must be provided behind an electrical appliance to allow them to be pulled away from mounting area for inspection and service work.
- g) All lights that have their sockets in a weather exposed area shall have corrosion preventative compound added to the socket terminal area.

The warning lights shall be switched in the chassis cab with labeled switching in an accessible location. Individual rocker switches shall be provided only for warning lights provided over the minimum level of warning lights in either the stationary or moving modes. All electrical equipment switches shall be mounted on a switch panel mounted in the cab convenient to the operator. For easy nighttime operation, an integral indicator light shall be provided to indicate when the circuit is energized. All switches shall be appropriately identified as to their function.

A single warning light switch shall activate all required warning lights. This switch will allow the vehicle to respond to an emergency and "call for the right of way". When the parking brake is activated, a "blocking right of way" system shall be automatically activated per requirements of NFPA #1901. All "clear" warning lights shall be automatically shed on actuation of parking brake.

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NFPA Required Testing of Electrical System

The apparatus shall be electrical tested before completion of the vehicle and prior to delivery. The electrical testing, certifications, and test results shall be submitted with delivery documentation per requirements of NFPA #1901. The following minimum testing shall be completed by the apparatus manufacturer:

1. Reserve capacity test:

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

2. Alternator performance test at idle:

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

3. Alternator performance test at full load:

The total continuous electrical load shall be activated with the engine running up to the engine manufacturer's governed speed. The test duration shall be a minimum of two (2) hours. Activation of the load management system shall be permitted during this test. However, an alarm sounded by excessive battery discharge, as detected by the system required in NFPA #1901 Standard, or a system voltage of less than 11.7 volts dc for a 12 volt nominal system, for more than 120 seconds, shall be considered a test failure.

4. Low voltage alarm test:

Following the completion of the above tests, the engine shall be shut off. The total continuous electrical load shall be activated and shall continue to be applied until the excessive battery discharge alarm activates. The battery voltage shall be measured at the battery terminals. With the load still applied, a reading of less than 11.7 volts dc for a 12-volt nominal system shall be considered a test failure. The battery system shall then be able to restart the engine. Failure to restart the engine shall be considered a test failure.

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NFPA Required Documentation

The following documentation shall be provided on delivery of the apparatus:

- a. Documentation of the electrical system performance tests required above.
- b. A written load analysis, including:
 1. The nameplate rating of the alternator.
 2. The alternator rating under the conditions.
 3. Each specified component load.
 4. Individual intermittent loads.

Multiplex Modem Kit

A kit shall be supplied to include modem, adapter for PDA device/laptop computer interface and adapter harness. The diagnostic hookup shall be located under the officer's side dash.

Multiplex Data Logger

The data logger shall record historical faults within the multiplex system and be accessible through the diagnostic software as well as the information center.

Electronic Siren

A Whelen 295HFSM1 electronic siren shall be installed in the cab. The siren amplifier and control panel module shall include a rotary selector for six (6) functions, on/off switch, push button switch for manual siren or air horn tones, and noise canceling microphone. Siren shall feature a mechanical siren tone in place of the piercer tone.

The electronic siren control shall be located in the center overhead console offset to officer side.

One (1) Federal model MS100 Dynamax 100 watt speaker shall be flush-mounted as far forward and as low as possible on the front of the cab. A polished Model MSFMT-EF "Electric F" grille shall be provided on the outside of the speaker to prevent road debris from entering the speaker.

Speaker dimensions shall be: 5.8 in. high x 5.8 in. wide x 2.6 in. deep. Weight = 5.5 lbs.

The speaker shall produce a minimum sound output of 120 db(A) at 10 feet to meet current NFPA 1901 requirements.

The speaker shall be located officer side front bumper.

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Mechanical Siren

A chrome plated and exterior mounted Federal Q2B-P coaster siren shall be installed on top of the front bumper extension. An electric siren brake switch shall be located on the main cab switch panel.

The siren shall be located driver side front bumper.

Light Bar

A pair of Whelen 24" Mini-Freedom LED light bars (Model FNMINI) with MK9 low profile mounts shall be provided. The light bar shall consist of two (2) front corner red linear LEDs, one (1) white front linear LED and one (1) end red linear LED.

No rear facing LEDs.

The clear LED shall be switched off in blocking right of way mode.

The light bar(s) shall be installed in the following location: front cab corners

Lower Level Warning Light Package

Eight (8) Whelen 600 Series, two (2) Whelen 500 series LED light heads all with red lenses shall be provided.

The lights will be wired with weatherproof connectors and shall be mounted as close to the corner points of the apparatus as is practical as follows:

- Two (2) 600 series LED light heads on the front of the apparatus facing forward
- Two (2) 600 series LED light heads on the rear of the apparatus facing rearward
- Two (2) 600 series LED light heads - 1 each side of the apparatus at the forward most point (as practical) side facing
- Two (2) 600 series LED light heads - 1 each side of the apparatus centrally located to provide midship warning lighting
- Two (2) 500 series LED light heads - 1 each side at the rearward most point (as practical) side facing

The side facing lights shall be located at forward most position, centered in rear wheelwell, and side facing at rear of body in rubrail if equipped.

Six (6) additional Whelen 500 Series LED (Light Emitting Diode) light heads with red lens shall be provided. The rectangular lights shall be wired with weatherproof connectors and shall be surface mounted one (1) each side in pump module rubrail, one (1) each side below compartment just ahead of rear wheels in rubrail, and one (1) each side just behind rear wheels in rubrail.

All warning devices shall be surface mounted in compliance with NFPA standards.

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Upper Side Warning Lights

Two (2) Whelen Model L31H Super LED beacons with Red domes shall be supplied.

The lights shall be located above L2/R2 compartments offset rearward to supplement upper rear warnings to meet Zone C upper requirements.

Upper Rear Warning Lights

Whelen Model B6LED beacons shall be supplied on polished aluminum mounts. Each unit shall consist of a LED upper beacon with red dome and a 700 series Super LED with Red lens.

The lights shall be located rear upper body on aerial style brackets to meet Zone C upper requirements.

Preemption Emitter

A Tomar model 3060 preemption emitter with chrome-plated housing shall be installed. The emitter shall be located front of cab above grille.

Cab Side Lighting

A pair of Whelen 600 Series red LED lights shall be mounted (1) each side of the cab below the canopy windows.

LED Marker Lights

Trucklite LED clearance/marker lights shall be installed as specified.

Upper Cab:

- Five (5) amber LED clearance lights on the cab roof.

Lower Cab:

- One (1) amber LED side turn/marker each side of cab ahead of the front door hinge.

Upper Body:

- One (1) red LED clearance light each side, rear of body to the side.

Lower Body:

- Three (3) red LED clearance lights centered at rear, recessed in the rubrail.
- One (1) red LED clearance light each side at the trailing edge of the apparatus body, recessed in the rubrail.
- One (1) amber LED clearance light each side front of body just in front of rear wheels, recessed in the rubrail.
- One (1) amber LED clearance/auxiliary turn light each side front of body, recessed in the rubrail.

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Aerial Platform:

- Three (3) amber LED clearance lights centered on the front lower section of the aerial platform.

License Plate Light

One (1) Truck-Lite Model 15205 white LED license plate light mounted in a Truck-Lite Model 15732 chrome-plated plastic license plate housing shall be mounted at the rear of the body.

Tail Lights

Three (3) Whelen model 600 series L.E.D. (Light Emitting Diode) lights shall be installed in a Cast 3 housing in a vertical position, each side at rear and wired with weatherproof connectors.

Light functions shall be as follows:

- L.E.D. red running light with red brake light in upper position.
- L.E.D. amber populated arrow pattern turn signal in middle position.
- L.E.D. clear backup light in lower position.

A one-piece polished aluminum trim casting shall be mounted around the three (3) individual lights in a vertical position.

Marker Lights

One (1) pair of Britax model L427.203L.12V LED amber/red marker rubber housed lights shall be provided. The lights shall be located on the rear body corners mounted in the down angle position. The red lenses shall illuminate to the rear of the apparatus and the amber shall illuminate to the front of the apparatus. The lights shall be wired to the marker light circuit.

Compartment Light Package

One (1) R.O.M. compartment light strip shall be mounted in each body compartment greater than 4 cu ft. Transverse compartments shall have two (2) lights, located one (1) each side.

Each light bar shall include 12" long strips of 24 super bright white LEDs mounted to circuit boards that have acrylic conformal coating for corrosion protection. The LED circuit boards shall be mounted to an extruded aluminum base with lexan lens.

Compartment lights shall be wired to a master on/off rocker switch on the cab switch panel.

The wiring connection for the compartment lights shall be made with a weather-resistant plug in style connector. A single water- and corrosion-resistant switch with a polycarbonate actuator and sealed contacts shall control each compartment light. The switch shall allow the light to illuminate if the compartment door is open.

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Step Lights

The apparatus shall be equipped with a sufficient quantity of lights to properly illuminate the steps around the apparatus in accordance with current NFPA requirements. The lights shall be 4" circular LED (Light Emitting Diode) with clear lenses mounted in a resilient shock absorbent mount for improved bulb life. The wiring connections shall be made with a weather resistant plug in style connector.

The step lights shall be switched from the cab dash with the work light switch.

Ground Lights

The apparatus shall be equipped with a sufficient quantity of lights to properly illuminate the ground areas around the apparatus in accordance with current NFPA requirements. The lights shall be 4" circular with clear lenses mounted in a resilient shock absorbent mount for improved bulb life. The wiring connections shall be made with a weather-resistant plug in style connector.

Ground area lights shall be switched from the cab dash with the work light switch.

One (1) ground light shall be supplied under each side of the front bumper extension if equipped.

Lights in areas under the driver and crew area exits shall be activated automatically when the exit doors are opened.

12 Volt Scene Lights

Four (4) Whelen 600 Series scene clear lights shall be provided - one (1) each side of cab rearward of forward doors up high, one (1) each side over rear ladder tunnel with switches in cab. Each shall be 12 volt 35 watt halogen light heads with internal light deflecting optics. The internal light deflecting optics shall redirect the light up to 26 degrees.

The rear scene lights shall be activated when the chassis is placed in reverse to provide additional lighting, in addition to the back-up lights, when backing the vehicle.

Additional 12 Volt Scene Lights

Two (2) Federal GHSCENE lights with clear lenses shall be provided. Each light shall include (2) 20-watt halogen fixtures within the light housing. Both lights, within each housing, shall be adjustable horizontally and vertically to provide desired coverage. All electrical connectors are to be enclosed in the housing providing protection against the elements. Lights shall be located driver and officer side pump module up high.

Hosebed Light

A Truck-Lite rectangular light shall be installed at the front area of the hosebed to provide hosebed lighting per current NFPA 1901. The rectangular rubber housing shall contain a 12-volt 2700 candlepower halogen floodlight bulb. The hosebed light shall be switched with work light switch in the cab.

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Crosslay Light

A Truck-Lite rectangular light shall be installed at the rear area of the crosslay to provide crosslay lighting per current NFPA 1901. The rectangular rubber housing shall contain a 12-volt 2700 candlepower halogen floodlight bulb. The hosebed light shall be switched with work light switch in the cab.

Map Light

A Federal "Littlite" LED map light model LF18TSB-LED shall be supplied. The map light shall be 12 volt with 18" flexible gooseneck and a matte black finish. It shall be located officer's a post.

Handheld Spotlight

A specialty #2150 hand held spotlight with mounting bracket shall be provided. It shall be located officer's side with a 12 volt receptacle.

Engine Compartment Light

There shall be lighting provided in compliance with NFPA to illuminate the engine compartment area.

LED Pump Panel Light Package

Four (4) Whelen LED Strip lights shall be mounted under a light shield directly above each side pump panel. The work light switch in the cab shall activate the lights when the park brake is set.

Pump Compartment Light

An incandescent light shall be provided in the pump compartment area for NFPA compliance. The light shall be wired to operate with a switch located on the pump panel.

Back-Up Alarm

An electronic back-up alarm shall be supplied. The 97 dB(A) alarm shall be wired into the chassis back-up lights to signal when the vehicle is in reverse.

Alternating Headlights

The chassis high beam headlights shall alternately flash and shall be controlled by a rocker switch mounted inside the cab.

10 KW Hydraulic Generator

A Smart Power Model HR-110 top mount style 10000 watt hydraulic generator shall be provided. The generator shall be installed officer side of open storage area.

The unit shall come equipped with: modular generator unit (which includes the hydraulic motor and filter, generator, and cooler), axial piston hydraulic pump, hydraulic reservoir, and a gauge panel.

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The gauge panel shall display voltage, hour meter, frequency, and amperage.

The hydraulic motor, generator, blower, cooler, and necessary hydraulic components shall be mounted in a rugged steel case.

The modular generator unit shall be 32" long x 13.50" wide x 17.00" high and weigh approximately 240 pounds.

The hydraulic pump shall be driven by a chassis transmission mounted power take off (PTO).

A PTO engage switch and generator control switch shall be mounted on the cab instrument panel to engage the PTO and start the generator.

An additional generator switch shall be installed at the pump panel.

Ratings and Capacity

Rating:	10000 watts continuous 12000 watts peak
Volts:	120/240 volts
Phase:	Single, 4 wire
Frequency:	60 Hz
Amperage:	83 amps @ 120 volts or 42 amps @ 240 volts
Engine speed at engagement:	Recommend below 1000 RPM
Operation range:	800 to 2100 RPM

3rd Party Generator Testing

The generator shall be tested at the manufacturer`s facility by an independent, third party testing service. The conditions and testing of the generator shall be as outlined in current NFPA 1901.

The test shall include operating the generator for two hours at 100% of the rated load. Power source voltage, amps, frequency shall be monitored. The prime mover`s oil pressure, water temperature, transmission temperature (if applicable) and power source hydraulic fluid temperature (if applicable) shall be monitored during testing.

The results of the test shall be recorded and provided with delivery documentation.

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Breaker Panel

A ten (10) place breaker box with up to ten (10) appropriately sized ground-fault interrupter circuit breakers shall be supplied. The breaker box will include a master breaker sized according to the generator output. The breaker box will be located in the specified compartment, not to exceed 12` run of wire.

Dimensions: 17.92” high x 14.25” wide x 3.75” deep.

Location: L1 back wall horizontally mounted above offset.

Receptacles

Two (2) 20 amp/110-volt 3 prong straight blade (NEMA #5-20) duplex household receptacle with stainless steel cover plate shall be installed in a non-weather exposed area as specified by the department. The receptacle shall be wired to the inlet receptacle were it will have overcurrent protection from an external source.

Location: in cab driver and officer side on 3 x 3 post rear facing just above engine cover.

Four (4) 20 amp/110 volt (NEMA #L5-20) twist lock receptacles with weatherproof cover plate shall be installed as specified by the department.

Location: driver side of gravel shield rearward, officer side of gravel shield rearward, driver side rear of body, officer side rear of body

Quartz Lights

Two (2) Kwik-Raze model 36 Magnafire quartz light heads with 750 watt/120-volt halogen bulb rated at 19,200 Lumens mounted on a Kwik-Raze model 500-W/2 bottom raising aluminum telescopic pole with up indicator switch shall be installed.

The light assembly shall be externally mounted on the driver and officer side back of cab. The pole shall allow for 360-degree rotation of the light. A locking knob shall hold the pole at the desired height.

The lights shall be switched in the cab from the driver's side overhead console.

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Electric Cord Reels

Hannay electric cord reel(s) (ECR 1616-17-18) shall be installed and located in L3 and R3 compartment.

The reel(s) shall include 200' of black 10 gauge 3-conductor type SOWA cord. The cord shall be rated at 20 amps @ 110 volts. The end of the cord shall be terminated for the installation of a department-required connector.

A heavy-duty rubber covered electric reel rewind button shall be installed.

The cord ends shall terminate with Fire Power 20 amp, 110 volt female cord connector model #FP-80.

Stainless steel cord reel rollers shall be installed and located on the reel. The rollers shall facilitate smooth removal of the electric cord.

100 Foot Rear Mount Elevating Platform

Elevating Platform Requirements

It is the intent of these specifications to describe a telescopic elevating platform of the open truss design that is compliant with NFPA 1901 (2003 edition) Chapter 20 sections 20.7 through 20.12 and sections 20.17 through 20.25. Some portions of this specification exceed minimum NFPA recommendations and are to be considered a minimum requirement to be met.

The elevating platform shall consist of three (3) extruded aluminum telescopic ladder sections operating from approximately -6 degrees to 80 degrees and designed to provide continuous egress for firefighters and civilians from an elevated position to the turntable.

The elevating platform shall have a vertical height of not less than 100' at full extension and elevation. The measurement of height shall be consistent with NFPA 1901 section 20.7.2.

The rated horizontal reach shall be 91'-6". The measurement of horizontal reach shall be consistent with NFPA 1901 20.7.3. The measurement shall be from the outer edge of the platform handrail at full extension to the centerline of turntable rotation.

The aerial shall be able to rotate 270 degrees at -6 degrees elevation and a full 300 degrees at -3 degrees elevation.

The aerial shall have a maximum stabilizer spread of 15'-6" from pin to pin with the stabilizers deployed to maximum extension. The aerial platform shall be rated to provide full operating capacities in up to 35 mph wind conditions.

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Aluminum Elevating Platform

The aerial ladder shall exceed the requirements of NFPA 1901 20.7 Elevating Platform Requirements as detailed in these specifications. To ensure a high strength-to-weight ratio and an inherent corrosion resistance, the aerial device shall be completely constructed of high strength aluminum. All side rails, rungs, handrails, uprights, and K-braces shall be made of structural 6061T6 aluminum alloy extrusions. All material shall be tested and certified by the material supplier. All ladder sections shall be semi-automatically welded by inert gas shielded arc welding methods using 5356 aluminum alloy welding wire. Structural rivets or bolts shall not be utilized in the ladder weldment sections.

Due to the unpredictable nature of fire-ground operations, a minimum safety factor of 2.5 to 1 is desired. This structural safety factor shall apply to all structural aerial components including turntable and torque box stabilizer components. Definition of the structural safety factor shall be as outlined in NFPA 1901 A.20.20.1:

DL = Dead load stress. Stress produced by the weight of the aerial device and all permanently attached components.

RL = Rated capacity stress. Stress produced by the rated capacity load of the ladder.

WL = Water load stress. Stress produced by nozzle reaction force and the weight of water in the water delivery system.

FY = Material yield strength. The stress at which material exhibits permanent deformation.

$$2.5 \times \mathbf{DL} + 2.5 \times \mathbf{RL} + 2 \times \mathbf{WL} \text{ equal to/less than } \mathbf{FY}$$

The minimum NFPA specification is exceeded in this paragraph by requiring safety margin above 2 to 1 while flowing water.

The stability factor or tip over safety margin shall be a minimum of 1.5 to 1 as defined by NFPA 1901 20.21.

An independent engineering firm shall verify the aerial safety factor. Design verification shall include computer modeling and analysis performed by an independent registered professional engineer. Verification shall include written certification from the independent engineering firm made available by the manufacturer upon request from the purchaser.

All welding of aerial components, including the aerial ladder sections, turntable, torque box and outriggers shall be performed by welders who are certified to American Welding Society Standards D1.1, D1.2 and D1.3 as outlined in NFPA 1901 20.22.3.1.

The weldment assemblies of each production unit shall be tested visually and mechanically by an ASNT certified level II non-destructive test technician to comply with NFPA 1901 20.22.2. Testing procedures shall conform to the American Welding Society Standard B1.10 Guide for non-destructive testing. Test methods may include dye penetrate, ultrasound, and magnetic particle where applicable.

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Each ladder section shall consist of two (2) heavy extruded aluminum side rails and a combination of aluminum rungs, tubular diagonals, and two (2) full-length handrails. The rungs on all sections shall be K-braced for maximum lateral stability. This K-bracing shall extend to the center of each rung to minimize ladder side deflection.

The ladder rungs shall be designed to eliminate the need for rubber-rung covers. The rungs shall be spaced on 14-inch centers and have integral skid-resistant surfaces as outlined in NFPA 1901 20.2.5. An oval-shaped rung shall be utilized to provide a larger step surface at low angles and more comfortable grip at elevated positions. The minimum design load shall be 500 pounds distributed over a 3-1/2 `` wide area per rung as outlined in NFPA 1901 20.2.5.4.

The aerial ladder shall exceed NFPA 1901 sections 20.2.6 and 20.2.8 governing the minimum ladder section width and handrail height. The following minimum dimensions shall be used in the construction of the aerial device:

Section	Width	Height
Base Section	45-1/4``	34-5/8``
Second Section	36-1/4``	30-3/8``
Fly Section	28-1/2``	26-9/16``

Firefighting Platform

The platform shall be entirely constructed of aluminum and mounted to the end of the fly section. The inside of the platform shall measure 37-1/4`` long x 74-3/4`` wide and contain 18.9 square feet of floor space. This exceeds the minimum NFPA 1901 20.7.6 requirement of 14 square feet. A continuous railing with 42`` high side rails shall be supplied on all sides of the platform. There shall be no openings below the handrail larger than 24`` in either direction.

The platform shall be constructed using a perimeter pipe system to carry water and serve as a structural component of the platform. The design of the platform shall minimize the distance between ladder centerline and platform bottom heat shield. This requirement is to provide maximum visibility for the driver. A 4`` high kick plate and grated floor assembly shall be supplied on the platform floor. The grated floor shall prevent water accumulation in the platform. These requirements are detailed in NFPA 1901 20.7.6.3 through 20.7.6.5.

A reflective aluminum heat shield shall be supplied on the front, bottom, sides, and rear of the platform as outlined in NFPA 1901 20.7.6.6.

A step shall be supplied over the pipe system around the front and sides of the platform for easy egress. This step shall be 8`` deep and provide an additional 6.5 square feet of platform floor space.

The platform shall have three (3) gates for entry and exit, exceeding the two (2) required by NFPA 1901 20.7.6.2.2 through 20.7.6.2.3. Two (2) of the gates shall be mounted on the front corners of the platform. The front gates shall be 20-1/2`` wide with inward swinging spring-

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loaded doors. Each front door shall have an interior mounted self-latching handle. The front door handles shall have a push-to-open emergency release feature to allow the doors to be opened from the exterior by applying a force greater than 90 lbs. on the door. This feature allows for quick entry into the platform without having to locate or actuate the handle. The third platform access shall be at the rear of the platform to enter from the ladder. A Fire Research Aerial Saver shall be mounted in the opening with a loop that extends under the bar. The bar shall slide up or in, but not out toward the base.

Harness Attachments

There shall be four (4) attachment rings inside the platform for operators to attach fall protection harnesses (Life Belts). The rings shall be designed for personnel harnesses and are not intended to secure rescue ropes.

Platform Water Curtain

A water curtain system shall be installed under the platform to provide a 75 GPM cooling stream beneath the platform as outlined in NFPA 1901 20.7.6.7. The nozzle shall be controlled from the base and tip control stations.

Platform Leveling System

An automatic platform leveling system shall be supplied as outlined in NFPA 1901 20.10.2. The system shall provide automatic leveling through a dual redundant hydraulic cylinder system. The system shall incorporate (4) hydraulic cylinders to level the platform. The lower cylinders shall be mounted between the aerial turntable and base section and the upper cylinders shall be mounted between the fly section and the platform. The system shall utilize oil exchange between the cylinders to provide smooth leveling at all operating positions. In addition to the automatic controls, the system shall include manual controls located at both the base and the platform to adjust platform pitch if needed. The system shall be supplied with load holding valves on the upper cylinders to prevent movement of the platform in the event of a ruptured hydraulic hose.

Platform Lifting Eyes

A pair of lifting eyes shall be provided below the platform. The lifting eyes shall allow for a load of 375 pounds each (750 pounds total).

Aerial Finish

To reduce maintenance expense the aerial shall have a natural aluminum swirled finish. Visible inspection of all ladder weld joints shall be possible without having to remove paint or body filler to reveal the weld bead.

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Ladder Extension Mechanism

Both power extension and retraction shall be furnished and meet the requirements of NFPA 1901 section 20.19, 20.20.3, and 20.5.3. Extension shall be by way of two (2) extending cylinders mounted on the side of the base section of the ladder.

Extension Cylinder Size:

Bore: 5''
Stroke: 77''

The cylinders shall operate through a block and tackle cable arrangement to extend and retract the ladder. Maximum extension of the ladder is to be automatically limited by the stroke of the cylinders. The normal operating cable safety factor shall be 5:1 and the stall safety factor shall be 2:1 based on the breaking strength of the cables. The minimum ratio of the diameter of wire rope used to the diameter of the sheave used shall be 1 to 12. The cables shall be treated with Pre-Lube 6 for increased service life.

Ladder Cable Size:

1st section (4 cables 2 extend, 2 retract): 3/4'' 6 x 19 galvanized cable
2nd section (4 cables 2 extend, 2 retract): 1/2'' 6 x 19 galvanized cable

Ladder Slide System

The ladder assembly shall consist of three (3) separate weldments that shall extend and retract within each other. Polymer slide pads shall be utilized between each section to minimize friction. Four (4) interlocking load transfer stations shall be utilized at the end of each of the two (2) base ladder sections. The interlocking load transfer stations shall handle load transfer between ladder sections and encapsulate the slide pads.

The two (2) base ladder sections shall each be provided with six (6) slide cushions. The cushions are designed to limit movement between the ladder sections resulting in smoother operation and less wear on the ladder sections.

Aerial Extension Indicator

Reflective tape stripes shall be installed on the ladder top handrail of the base section to indicate extension in 5-foot increments. Numbers shall be supplied at 10-foot increments. A reflective dot on the base of the 2nd section shall provide a visual reference for the operator to estimate aerial elevation.

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Elevating Platform Operating Positions

The elevating platform shall have two (2) control stations as outlined in NFPA 1901 20.9 with the lower controls capable of overriding the platform controls. The operator's lower position shall be located on the left side of the aerial turntable. The console shall be angled with an etched panel for long service life. The lower control panel shall feature a roll-top type of cover to protect all controls from the elements. The upper control console shall be located in the front center of the platform and shall include all of the operational, aerial functions, and control switches (less the Intercom controls) as in the lower console. The centered console location shall allow easy access in and out of the left and right corner gates.

The consoles shall include lighting for night operations and controls shall all be labeled for easy identification of operation.

Aerial Ladder Control Levers

The control levers shall be arranged as outlined in NFPA 20.17.7. The first lever from the left shall be the extension control (forward for extend and back for retract). The second lever shall be for rotation (forward for clockwise and back for counter clockwise). The third handle shall control elevation (forward for down and back for up). A ring around the control console shall be provided to prevent unintentional movement as outlined in NFPA 20.17.6.2.

Variable Speed Control System

The aerial hydraulic system shall be equipped with a microprocessor based control system that shall deliver variable rotation and elevation speeds based on platform position. The system shall allow the aerial to proportionately operate quicker, either through elevation or retraction, as the platform is brought in closer to the turntable centerline. This feature provides quicker ladder movement when not fully extended and/or elevated. The variable speed system also offers the operator more consistent platform movement speed (distance per second) regardless of platform location, equating to more predictable aerial control.

The aerial control system shall include electronic ramping to provide smooth acceleration and deceleration of aerial functions during sudden movements of the operator control levers. The control system shall also monitor the end of the stroke position of both the elevation and extension cylinders to bring the aerial to a smooth and controlled stop at the end of the cylinder stroke.

The control system shall be provided with a slow speed (Creep) switch. This switch, when activated, shall reduce aerial operating speeds, allowing for pinpoint platform placement. When in the creep mode, the ramping feature of the controls system shall be disabled allowing for precise aerial placement.

The control system shall have self-diagnostic features and be pre-set at the factory.

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The elevating platform shall utilize six (6) proportional control valves for aerial device movements. The electro-hydraulic valves shall permit the use of base and tip controllers and minimize hydraulic connections.

The hydraulic system valve body shall be located under the ladder base step to provide as much turntable workspace as possible.

The control system shall have manual overrides in the event of a system failure. The overrides shall be located in a compartment just below the turntable control console. The manual system shall be organized to match the base controllers and its function labeled.

Body Protection System

The control system shall monitor rotation angle and elevation angle and shall automatically control the operational envelope of the aerial device to prevent contact with the aerial body or cab during low-level operations. The system shall bring the aerial to a smooth and controlled stop whenever the aerial is approaching the body or cab. Indicator lights shall be included on both control consoles will show that the system has limited aerial movement. A momentary switch shall be provided at each control console to allow the operator to over-ride the body protection system and move the aerial closer to the body if needed.

Load Indication System

Two (2) lighted elevation/safe load indicator diagrams shall be provided on the aerial ladder to indicate safe load capacity at any angle of elevation. One (1) shall be located on the lower right side of the base section, and one (1) shall be located upper left side of the fly section. The safe load indicators shall be 15" x 15" in size and clearly communicate aerial capacity in any one of the following conditions: tip load, tip load with water flowing, and distributed load at full extension. The charts shall identify capacity using graphic characters to indicate each 250 lb. increment. The charts shall be illuminated and contain warnings for electrocution hazards from power lines and lightning.

Operation Times

The aerial shall complete the NFPA 1901-20.7.5 time test in no more than 100 seconds, exceeding the NFPA minimum requirement of 150 seconds. This test involves raising the aerial from the bedded position to full elevation and extension and rotating to 90 degrees. This test is to begin with the stabilizers deployed.

Time to extend ladder:	35-45 seconds
Time to retract ladder:	30-40 seconds
Time to raise ladder (fully retracted):	40-50 seconds
Time to raise ladder (fully extended):	65-75 seconds
Time to lower ladder (fully retracted):	35-45 seconds
Time to lower ladder (fully extended):	60-70 seconds

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Time to rotate 180 degrees (fully retracted): 45-55 seconds
Time to rotate 180 degrees (fully extended): 95-105 seconds

Elevating Platform Rated Capacity

The aerial device shall have a rated capacity of 1305 lbs. consistent with NFPA 1901 20.8.1 and 20.8.2. The rated capacity shall include 1000 lbs. in personnel allowance and 305 lbs. for equipment mounted at the tip of the aerial. The aerial device shall be rated in multiple configurations as outlined in 20.8.5.

The elevating platform shall be capable of delivering a 1250 GPM master stream from the platform while carrying a minimum of 500 lbs. as outlined in 20.8.3. A sign mounted at the base of the aerial shall communicate the following ratings in the unsupported fully extended configuration while maintaining a 2.5 to 1 safety margin as defined in NFPA 1901. The loads in each configuration are in addition to 305 lbs. of equipment mounted at the tip.

Condition #1- Tip load only, no water flowing

Elevation	Capacity	Pounds
-6 to 80 degrees	4 people	1000 lbs.

Condition #2- Distributed loads no water flowing (These include two people in the platform from -6 to 44 degrees and four people in the platform from 45 to 80 degrees)

Elevation	Capacity	Pounds
-6 to 20 degrees	5 people	1250 lbs.
21 to 30 degrees	6 people	1500 lbs.
31 to 45 degrees	10 people	2500 lbs.
46 to 80 degrees	12 people	3000 lbs.

Condition #3- Platform tip load while flowing 1250 gpm with pre-piped waterway

Elevation	Capacity	Pounds
-6 to 80 degrees	2 people	500 lbs

Hydraulic System

Hydraulic power for all operations shall be supplied by a chassis-mounted variable displacement pressure compensated pump for consistent and rapid response. The variable displacement piston pump shall be able to supply 30 GPM at a maximum pressure of 3000 PSI. The system shall operate between 1000 and 2500 PSI with flow controls to protect hydraulic components and incorporate a relief valve set at 2800 PSI to prevent over-pressurization.

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An interlock device shall be provided to prevent activation of the aerial ladder hydraulic pump until either the transmission is placed in neutral and the parking brake is set, or the transmission is placed in drive and the rear driveline is disengaged as outlined in NFPA 20.17.3.

The hydraulic system shall be of the latest design and incorporate features to minimize heat build up and provide smooth control of the aerial ladder. The system shall meet the performance requirement in NFPA 20.19.6 and 20.19.7, which requires adequate cooling under 2 ½ hours of operations. To control operating system temperature, a hydraulic oil cooler shall be supplied. The air to oil cooler shall be mounted on the turntable so as not to reduce the cooling capacity of the engine. A 12-volt fan shall move air across a tube and fin radiator system. The cooler shall be mounted on the turntable ahead of the operator's console.

All hydraulic components that are non-sealing whose failure could result in the movement of the aerial shall comply with NFPA 20.19.1 and have burst strength of 4 to 1. Dynamic sealing components whose failure could cause aerial movement shall have a margin of 2 to 1 on maximum operating pressure per NFPA 20.19.1.1. All hydraulic hoses, tubes, and connections shall have minimum burst strength of 3 to 1 per NFPA 20.19.2.

The hydraulic system shall consist of a 60-gallon reservoir mounted to the torque box and plumbed to the hydraulic pump. The tank shall be supplied with a removable top to access the tank strainer filter. There shall be plumbing for a supply and return line and a tank drain on the reservoir. The reservoir cap shall be marked per NFPA 20.19.5.2. Gated valves under the tank shall facilitate filter changes. Connections on the bottom of the tank shall utilize flange fittings for ease of service.

The hydraulic system shall use 5w-20 multi-weight, SAE 32 grade oil and incorporate the following filters to provide dependable service:

Reservoir Breather:	10-micron
Magnetic Reservoir Strainer:	125-mesh
Pressure Filter (Torque Box):	3-micron
Return Filter:	10-micron

The aerial hydraulic system shall be designed in such a manner that a hydraulic pump failure or line rupture shall not allow the aerial or outriggers to lose position. Hydraulic holding valves shall be mounted directly on cylinders. To ensure reliable performance of holding valves, no hoses shall be permitted between a holding valve and cylinder.

The hydraulic system shall be designed with an auxiliary power unit meeting the guidelines of NFPA 1901 20.18.6. The auxiliary power unit shall be two (2) 12 volt pumps connected to the chassis electrical system. The pumps shall provide operation at reduced speeds to store the aerial device and stabilizers for road transportation. Self-centering switches shall be provided at the turntable and each stabilizer control station to activate the system. The system shall be designed to provide a minimum of five (5) minutes of hydraulic power to operate functions.

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Hydraulic power to the ladder shall be transferred from the torque box by a hydraulic swivel.

Aerial Torque Box

The aerial shall utilize an integral torque box design. The integral torque box design shall serve to carry the chassis, body, and aerial device as an integrated system. The system design shall provide a lower center of gravity to enhance road performance, a mounting location for under-slung stabilizers, and additional space for body compartments. The strength of the torque box shall be a minimum 19 million-inch pounds resistance to bending moment. The stabilizers and turntable supports shall be welded directly to the torque box.

Stabilization

The unit shall be equipped with two sets of extendable crisscross under-slung stabilizers. The stabilizers shall have a spread of 15'-6" centerline-to-centerline of the stabilizer pads when fully extended. One set of stabilizers shall be mounted in the forward body area and a second set close to the rear axle to minimize impact on departure angle.

The stabilizers shall have a tip over safety margin of 1-1/2 times the rated load imposed by the aerial in any position the aerial device can be placed as outlined in NFPA 1901 20.21.2. The apparatus stabilization shall be accomplished without the assistance of the chassis suspension or tires in contact with the ground.

The aerial shall be able to sustain a 1-1/3 to 1 rated load on a 5-degree slope downward in the position most likely to cause overturning as outlined in NFPA 1901 20.21.3. The maximum ground slope the apparatus can be set up on is 14 percent. On the 14 percent slope the apparatus can be leveled within a 6 percent operating range for the apparatus.

The cylinders shall be supplied with dual pilot-operated check valves on each stabilizer cylinder to hold the cylinder in the stowed or working position should a charged line be severed at any point in the hydraulic system. The stabilizers shall level side-to-side, corner-to-corner and front to rear on uneven terrain. Stabilizers shall contain safety lock valves. This assures there will be no "leak down" of stabilizer legs. Mechanical pins are not required. This feature contributes to efficient set-up and field operation.

The stabilizer lift cylinders shall be sized to maximize ground penetration. The lift cylinders shall be mounted on the side of the torque box for protection and shall have the following dimensions:

Bore: 7"
Stroke: 12-1/2"

The stabilizer extension cylinders shall have the following dimensions:

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Bore: 2"
Stroke: 54-3/4"

Each stabilizer that can be extended from the body shall be supplied with a red warning light as outlined in NFPA 20.21.4.4. A stabilizer extended warning light shall be supplied in the cab to warn the driver of an extended stabilizer condition as outlined in NFPA 1901 13.11. A floodlight shall be supplied in each stabilizer location to illuminate the stabilizer and ground. The light shall automatically turn on with the deployment of a stabilizer.

The stabilizer ground contact area for each footpad shall be 10" x 14" without auxiliary pads and 26" x 26" with auxiliary pads deployed. The ground pressure shall not exceed 75 psi with auxiliary pads deployed when the apparatus is fully loaded and the aerial device is carrying its rated capacity in every position. This shall be accomplished with the stabilizer pads deployed, as outlined in NFPA 20.21.4.2.

Stabilizer Controls

Eight (8) electric solenoid valves shall control the stabilizers. The control switches shall be located at the rear of the apparatus so the operator may observe the stabilizers during deployment. An audible alarm with a minimum 87 dbA shall also sound while the stabilizers are in motion as required by NFPA 20.21.4.1. Stabilizer deployment shall be completed in less than 45 seconds.

There shall be an interlock that prevents the operation of the ladder until the stabilizers are down and properly set as outlined in NFPA 20.17.5. Four (4) micro-switches, one (1) on each jackleg, shall sense when all four (4) jack feet are in contact with the ground. This condition shall be indicated when all four (4) yellow jacks-down indicator lights are on and the green interlock light is on. When the apparatus has been leveled, a manual transfer switch shall be used to shift hydraulic power to ladder operations. The interlock system shall have a manual override with access through a door on the rear control panel.

To simplify leveling the apparatus, two (2) color-coded level indicators shall be supplied at the rear of the apparatus. One (1) indicator shall be for front to rear level and one (1) for side-to-side level.

Forward Aerial Support

The aerial ladder support shall be fabricated from structural steel. It shall be located behind the rear wall of the cab and shall be bolted to the frame rails to allow removal in case of accidental damage.

Turntable Support Assembly

The aerial ladder turntable assembly shall be mounted at the rear of the apparatus. The turntable support assembly shall be welded to the integral torque box for efficient transfer of aerial loads

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to the stabilizers and shall permit storage of ground ladders in the center rear of the apparatus. The complete turntable support assembly shall be multi-pass welded to the sides of the combination chassis frame torque box.

The turntable support assembly shall be a steel weldment constructed of four (4) vertical 1/2" x 6" x 6" square tubes with 1/2" x 5" x 5" square tubes welded around the top ends of the verticals.

A bearing mounting plate shall be welded to the top of the verticals and sides of the horizontals. The bearing mounting plate shall be 55-5/8" x 55-5/8" and shall have a 1-1/2" thickness. This bearing mounting plate shall be bulk-headed to a 3/4" steel plate that is welded to the bottoms of the horizontal tubing. The use of multi-pass welding shall be utilized wherever possible.

A 46-1/2" pitch diameter rotation bearing with a 3" face drive gear shall be bolted to the top of the bearing mounting plate with thirty (30) 7/8" grade 8 plated bolts. The gear tooth shall be involute stub tooth form.

Upper Turntable

The upper turntable assembly shall attach to the rotation bearing and the base of the ladder.

The turntable platform shall be a one-piece flanged steel plate that is a minimum of 96" in diameter and 3/8" thick. The right side of the turntable shall be modified to allow full access to the body's SideStacker hosebed. The working platform shall be covered with a non-skid material for operator safety.

Three (3) railings 42" high shall be provided along the outside of the turntable disc as outlined in NFPA 1901 20.18.1. There shall be a control pedestal on the left side of the turntable.

Two (2) padded Fire Research brand ManSaver safety bars shall be mounted to the turntable handrails. The bars shall lift up and inward (towards the ladder) permitting easy entrance to the ladder and control console.

The turntable assembly shall provide a mounting base for the ladder and elevating cylinders. The turntable assembly shall be bolted to the turntable bearing by thirty (30) 7/8" grade 8 plated bolts.

The ladder pivot point shall connect to the upper turntable assembly by two (2) 3" high strength pivot pins in heavy wall composite Teflon-lined bearings.

Elevation Mechanism

The aerial shall utilize dual 7" diameter elevating cylinders and shall attach to the upper turntable assembly and the base section of the ladder by 3" ID spherical bearings. The elevation system shall be designed following NFPA 1901 20.10.3. The elevation hydraulic cylinders shall

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be electronically controlled to come to a smooth, controlled stop at each end of travel. The elevation cylinders shall incorporate integral load holding valves, which shall prevent aerial movement in the case of ruptured hydraulic lines to the cylinders. The hydraulic elevation cylinders shall also serve as a locking device to hold the aerial in the stored position for road travel.

Rotation Mechanism

The aerial shall be supplied with a hydraulically powered rotation system as outlined in NFPA 1901 20.5.2. The two (2) high-torque hydraulic rotation motors shall provide continuous rotation under all rated conditions and be supplied with a spring-applied brake to prevent unintentional rotation. The high torque rotation drives shall operate through a dual reduction planetary gear box that drives a spur gear mated with the ring gear on the rotation bearing. The rotation gearboxes shall be rated at 120,000 in. lbs. each.

Aerial Electric Power

A hydraulic swivel shall be installed to provide hydraulic fluid transfer to the aerial ladder cylinders, electrical power to the aerial ladder, and water delivery to the pre-plumbed waterway while permitting continuous 360-degree rotation.

The swivel shall provide three (3) hydraulic circuits, twenty eight (28) electrical circuits, and one (1) 4" passage for water flow. Nine (9) of the electrical circuits shall be CAN bus capable. The swivel shall also be equipped with a rotary encoder to provide aerial position data to the microprocessor based control system.

The swivel shall be environmentally sealed to prevent contamination of the hydraulic fluid.

Elevating Platform Water Delivery System

A 1250 GPM pre-piped waterway shall be supplied as outlined in NFPA 1901 20.12. The waterway shall telescope to the end of the third section to the platform water system. A waterway of 4" internal diameter shall run through the turntable and a swivel joint to connect to the tubular aerial waterway. The tubular waterway shall run under the aerial ladder. The waterway tubes shall have the following sizes:

Base Section:	5" OD
2nd Section:	4-1/2" OD
Fly Section:	4" OD

The tubes shall be constructed of 6063T6-anodized aluminum and shall be telescopic with the aerial ladder through sealed slip joints. The fly section waterway tubes shall be hard coated for wear resistance. The slip joints shall be designed with grease zerks fittings to facilitate lubrication.

A 1-1/2" drain valve shall be installed and operated from the rear of the apparatus.

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The water system shall be capable of flowing 1250 GPM at 100-PSI nozzle pressure at full elevation and extension. The friction loss between the tip and below the swivel shall not exceed 100 PSI while flowing 1000 GPM as outlined in NFPA 1901 20.12.1 and 20.12.2.

Waterway Relief Valve

An automatic relief valve preset at 250 PSI shall be installed in the aerial waterway to prevent over-pressurization of waterway system as outlined in NFPA 1901 20.12.8. The relief valve shall be mounted in the lower portion of the waterway where it enters the aerial torque box frame and dumps under the apparatus.

Aerial Hydraulic Oil Level Gauge

A hydraulic oil level gauge shall be supplied for easy fluid level verification. The three-light system shall indicate full oil level with a green light, acceptable oil level with yellow light, and low oil level with a red light. The display shall be located on pump operators panel.

Platform Preconnect

One (1) 2-1/2" discharge with an Akron 2-1/2" Pyrolite™ valve shall be located at the left rear of platform.

Reducing Elbow for Platform Discharge

One (1) 2-1/2" FNST x 2-1/2" MNST 30 degree chrome elbow shall be provided. One (1) 2-1/2" FNST x 1-1/2" MNST reducer shall be provided on the elbow. The elbow shall include a 1-1/2" chrome cap and chain. This shall allow the use of 2-1/2" or 1-1/2" hose from the platform outlet.

Waterway Inlet

One (1) 4" inlet shall be provided at the rear of the apparatus and shall be connected to the vertical pedestal waterway piping to supply water to the aerial waterway from an outside source. All fabricated piping shall be constructed of a minimum of Schedule 10 stainless steel piping to help prevent corrosion. The threads shall be NST. A long-handle chrome-plated 4" NST cap shall be installed on the inlet.

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Waterway Pressure Gauge

One (1) weatherproof 3-1/2" compound vacuum pressure gauge with a range of 30-0-600 shall be installed adjacent to the waterway inlet. The function of the gauge is to advise the aerial operator of the pressure within the waterway. The gauge shall be filled with a liquid solution.

Akron Monitor

Electric Monitor

The aerial platform shall come equipped with an Akron 3578 electrically controlled monitor with a SabreMaster 1577 straight bore / fog flow multi-purpose nozzle.

The platform waterway monitor shall have a horizontal sweep of 180 degrees (90 degrees either side of center) and a vertical sweep of 90 degrees (45 degrees above and below horizontal).

The monitor relay box shall include solid-state components and be coated to resist corrosion. The monitor shall have fully enclosed motors and gears with built in manual override capability and quick attach handles. The monitor shall be able to operate in the horizontal and vertical axis simultaneously.

Control switches for horizontal movement; vertical movement and pattern selection shall be located at the base of the platform at the turntable console.

The electric monitor and nozzle shall be capable of discharging 1250 gpm at 80-psi nozzle pressure.

Monitor Tip Controls

In addition to the controls at the operator console, electric monitor directional and stream controls shall be installed in close proximity to the monitor in the platform.

Platform Monitor Valves

A 4" inline butterfly valve shall be installed in the platform piping directly below the monitors. The valves shall be controlled from inside the platform by a hand wheel. The valves shall be of the slow closing type to prevent sudden pressure surges.

Combined Flow Rating

The monitors shall have a combined flow rating of 1500 GPM.

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LED Outrigger Lights (4)

Four (4) Truck-Lite Model 91 LED outrigger-warning lights with red lenses shall be provided.

The lights shall be surface mounted on the outrigger covers in compliance with current NFPA 1901.

Warning Lights on Front of Platform

Four (4) Whelen 600 Series Super LED light heads with RED diodes and red lenses shall be provided. The rectangular flashing lights shall be surface mounted low across the aerial platform and be wired to the upper level warning light package.

Warning Lights on Sides of Platform

The aerial platform shall be supplied with two (2) Whelen 600 Super LED warning lights.

The LED lights shall activate with aerial master switch.

The lenses shall be Red and be located the side of ground pad brackets.

Tip Spotlight

There shall be a 12V Collins spotlight with switch mounted on the tip of the aerial device. The light shall be located right side front of platform.

Ladder Climbing Lights

A lighting system to illuminate the climbing area inside each ladder section shall be provided. The lights shall be located above ladder rung level and directed toward the centerline of the ladder to reduce glare. A minimum of three 12-volt lights per section, with polished guards shall be wired and attached so as not to be an obstruction during climbing. The lights shall be controlled with the ladder lights switch at the operators control console. The lens colors shall be amber at the base section, blue at the 2nd section, and red at the 3rd section.

Ladder Base Lighting

Two (2) Unity model AG-S-H floodlights shall be mounted at the bottom of the ladder base section, one (1) on each side. They shall be controlled from the turntable-operating pedestal.

Platform Quartz Lights

One (1) Kwik-Raze model 36 Magnafire quartz light head with 750-watt 120-volt halogen bulb rated at 19,200 Lumens mounted on a Kwik-Raze model 600 permanent mount non-telescoping base shall be installed on the aerial device and hardwired to the aerial tip. The light shall be fitted with a weather-resistant switch to control the light when the aerial power circuit is activated.

The light shall be located on the right side front of platform, and shall be switched in the cab from the driver's side overhead console.

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A Kwik-Raze model 36 Magnafire quartz light head with 750-watt 120-volt halogen bulb rated at 19,200 Lumens mounted on a Kwik-Raze model 200 top raising aluminum telescopic pole with up indicator switch. The light shall be fitted with a weather-resistant switch and hard-wired to the aerial tip power circuit. The pole shall allow for 360-degree rotation of the light. A locking knob shall hold the pole at the desired height.

The light shall be located at the left side rear of the platform.

A Kwik-Raze model 36 Magnafire quartz light head with 750-watt 120-volt halogen bulb rated at 19,200 Lumens mounted on a Kwik-Raze model 1400 permanent mount shall be mounted on the bottom of the platform to illuminate the area below. A weather-resistant switch shall be provided on the platform control panel to control the light when the aerial power circuit is activated.

Aerial Information System

The aerial device shall be equipped with an electronic system that displays critical information to the aerial operator for added safety. The system shall consist of a turntable-mounted display, platform mounted display, two (2) electronic control modules, sensors and an interface harness.

Information shall be conveyed to the operator through five (5) mission-specific screens, each tailored for a specific fireground activity. The screens display shall include available tip load, distributed load, master stream, aerial systems data and engine information.

The available tip load screen shall feature simple "Stick-Figure" type symbols that represent the allowable quantity of people at the tip. The screen layout shall be uncluttered allowing the symbols to be easily read at a glance. Systems that rely on hydraulic pressure to determine load shall not be acceptable.

In addition to available tip load, the system shall display the following information:

- Ladder extension (%)
- Ladder inclination
- Distributed load
- Waterway flow
- Waterway pressure
- Tip temperature
- Base temperature
- Hydraulic oil pressure
- Hydraulic oil temperature
- Rung alignment
- Cradle alignment
- Breathing air status (if equipped with breathing air)
- Engine coolant temperature
- Engine oil pressure

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- Battery voltage
- Engine speed

The system shall include alarms to indicate when breathing air is below 20% volume, tip temperature is greater than 300°F and hydraulic oil temperature is above 190°F.

In addition to the audible warnings, the system shall include visual warning indicators for low breathing air, high tip temperature and high hydraulic oil temperature.

Display Screens

- 5.6" Quarter VGA Transflective LCD screen with glass lens
- LED backlighting
- Environmentally hardened housing
- Five (5) function buttons with three (3) color LED backlighting
- Five (5) navigation buttons

Electronic Control Modules

- Environmentally sealed aluminum housing
- 40 MHz processor
- 448kB flash ROM
- 282kB SRAM
- 8kB EEPROM

Sensors

- Ladder extension
- Ladder inclination
- Waterway pressure
- Waterway flow
- Water presence
- Tip temperature
- Base temperature
- Hydraulic oil pressure
- Hydraulic oil temperature
- Cradle alignment
- Rung alignment
- Breathing air pressure (If equipped with breathing air)

Wiring harness

Wiring shall be individually and permanently function and color-coded every three (3) inches on the insulation. The insulation shall meet SAE standard J1128 in its latest edition for GXL or SXL

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temperature rating. All exposed wiring shall be run in a loom with a minimum 289 degree Fahrenheit rating. All wiring looms shall be properly supported and attached along the entire run.

Durability

The components shall be thoroughly tested and have a proven reliability in severe environments to ensure long life on the fireground. The system shall be capable of operating in a temperature range of -40°F through 185°F.

The display and processor shall remain operational through the following tests:

- Humidity Tolerance - Component shall operate properly during and after an eight-hour cycle in a humidity chamber at 115% of nominal system voltage and 90% relative humidity from its maximum operating temperature to -40°F and back to maximum temperature.
- Salt Spray - Component to function correctly at 115% of nominal system voltage while being subjected to a 5% salt spray for 48 hours at 100° F.
- Vibration - 8g random from 24-2000Hz
- Moisture Leakage - Components must be sealed to +/-5 psi against water and water vapor.
- Destructive over voltage - Component must not fail in an unacceptable condition when subjected to 180 volts DC for eight hours at maximum operating temperature.

Diagnostics

The system shall detect faults through routine self-diagnostics. These checks shall be carried out on power-up, power down and during operation. A fault validation technique shall be used to ensure that a fault has been present for a period of time before being declared detected. Each possible fault or event shall be identified and displayed by a unique diagnostic code, which shall be accessible through the service menu on the system display.

Aerial Intercom

A Firecom PantherC 3-way intercom shall be provided. The intercom shall include one (1) base unit located at the turntable control console, one (1) remote unit located at the aerial tip, and one (1) base unit located at the pump operator's panel. The system shall provide 24dB noise reduction to meet NFPA 1500 standards.

The base units shall include a push-to-talk (PTT) button to transmit to the tip unit and one (1) integrated headset unit Model # UH-10S. The tip unit shall be equipped with a hands-free intercom microphone and two (2) integrated headset jacks. Both the base, pump panel, and remote units shall be equipped with a weatherproof speaker; volume controls and automatic squelch control.

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Each unit shall have full two-way intercom communication and complete radio communication when the analog interface unit is added.

Aerial Tip Receptacle

A 110-volt Twist Lock 20-amp receptacle outlet shall be installed at the tip of the aerial device and wired into an apparatus breaker box with a 30-amp breaker. The breaker shall be fitted with a GFI protection feature. The receptacle box shall be fitted with a weather resistant cover.

Aerial Breathing Air System

The aerial device shall be supplied with a breathing air system as outlined in NFPA 1901 20.7.7 and section 25.5. The air system shall hold a total of 444 cubic feet of air carried in single DOT 444 cubic foot cylinder rated at 4500 psi. The air tank shall be painted yellow and marked with a label that read "High Pressure 4500 psi Breathing Air". The tank shall be mounted in accordance with NFPA 1901 25.5.7 and include a guard to protect the valve on the cylinder end.

All components of the piping system shall have a 3 to 1 safety margin. There shall be a high-pressure regulator supplied at the base of the aerial to reduce the air pressure to no more than 125 psi up the aerial. All valves fittings and hoses shall be constructed of corrosion resistant material. A pressure relief valve set at 1 1/2 times working pressure shall be supplied to relieve the air lines in the event of a pressure regulator failure. Two (2) 1/4" NPT outlets shall be provided in the platform for dealer/customer installed quick connects.

An air mask box shall be provided to store breathing air masks at the tip as outlined in NFPA 1901 20.7.7.4.

A low air breathing alarm shall be provided as outlined in NFPA 1901 section 20.7.7.5. The low air warning system shall provide an audible and visual warning when the air volume is at or below 20 percent.

Two (2) additional 1/4" NPT outlets shall be provided in the platform for dealer/customer installed quick connects.

A 50 ft length of air hose for 4500 psi breathing air system with quick connect fitting on each end shall be provided to permit the capability of filling air tanks without having to remove them from the aerial.

Pike Pole Mounts

There shall be one (1) aluminum tube mounted directly on the ladder for storage of a 6' pike pole. The tube shall be located right side fly section.

Hose Box

A hinged covered hose box shall be mounted at the platform. The box shall have sufficient capacity to hold 50' of 2-1/2" double jacket coupled fire hose and pistol type automatic nozzle. The box shall be located left side of platform.

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Stokes Basket Receiver

The platform shall have the capacity to receive a stokes basket at tip for rescue operations. Two welded removable structures shall be provided which shall fasten to the basket utilizing .5" x 2" stainless steel locking pins. The locking pins shall be attached by stainless steel cables to the stokes frame assembly.

The welded assembly shall be supplied with two carabiner hooks and Velcro straps to secure a Ferno Washington model #71 stokes basket.

The stokes receivers shall be able to be mounted in three locations:

- Left side of platform with basket positioned front to rear
- Right side of platform with basket positioned front to rear
- Rear of platform with basket positioned left to right across the rear

Brackets shall be provided to mount the stokes basket to the aerial while not in use. The stokes basket shall mount to the right side of the base section ahead of the sign plate.

Rappelling Rope Guides

Rope guides shall be provided on the platform for use when rappelling. The guides shall be constructed of polished stainless steel and be located one each side on the upper front handrail. Anchor points shall be provided each side down low on the rear of the platform for tying off the rappelling ropes. Load rating for each tie off point shall be 375 pounds.

Roof Ladder Bracket

A lift-out style roof ladder-mounting bracket shall be installed on the outside of the ladder base section. The bracket shall be designed to hold a PRL-12 on left side of base section.

Aerial Sign Plate

Two (2) 10" x 144" x 1/8" (0.125") thick smooth aluminum plates shall be provided. The plates shall have 1" lips top and bottom for rigidity. Each sign plate shall be bolted on either side of the base section, approximately at the midpoint. The plates shall be provided to display the department's name or other information. The plates shall be painted black to match the upper cab color.

Aerial Testing

The manufacturer shall include a statement from a licensed and registered independent, third party professional engineer employed by an independent, third-party engineering firm attesting that the aerial ladder on the unit bid is designed and will be provided with a minimum 2.5 to 1 structural safety factor based on the yield strength of the material. This safety factor shall include 2.5 times the dead weight of the aerial, plus 2.5 times the rated load capacity, plus 2

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times the water load stress. The safety factor shall be applicable to all components used in the construction of the aerial ladder, including all substructure and stabilizer components.

The manufacturer shall also include a statement from a licensed and registered independent, third-party professional engineer employed by an independent, third-party engineering firm attesting that the aerial and stabilizer system on the unit bid is designed and will be provided with a minimum of 1.5 to 1 stability factor or tip-over safety factor. This stability factor shall include 1.5 times the rated live load capacity. The stability factor shall apply when the vehicle is on a level surface, as well as when it is on a 5-degree downward side slope with the aerial in the direction most likely to cause overturning.

All quality control testing shall be performed by an ASNT-certified level II Non-Destructive Test Technician. The aerial ladder shall be tested in compliance with the current editions of NFPA 1901 and NFPA 1914. All sub-assemblies are to be inspected before assembly and body mounting.

Each aerial section shall be tested prior to the assembly of the complete aerial device. Each section shall be subjected to a visual weld inspection to assure the integrity of the weldment. Die penetrant shall be used as required to qualify suspected weld defect indications. All turntable mounting bolts, cylinder anchor pins, outrigger anchor pins, aerial hinge pins, and other critical mounting components are subjected to ultrasonic testing to detect any flaws.

A magnetic particle test shall be conducted on the torque box, aerial support structure, outriggers, outrigger support structure and all other structural ferrous aerial components. This test shall be performed to assure the integrity of the weldment.

After the aerial is assembled and installed on the vehicle, an operational inspection shall be made and the aerial shall be tested to comply with the applicable standards in the current editions of NFPA 1901 and NFPA 1914.

In addition to the above tests, the aerial shall successfully complete the following operational tests:

- 1) The completed apparatus shall be placed on a firm, level surface with the aerial stabilizers extended and down. The aerial shall lift a test weight equal to the rated tip load capacity, as specified herein, with the aerial at full extension, 0 degrees elevation, and rotated 90 degrees to either side of the truck chassis. The test weight shall be lifted from 0 degrees to 15-20 degrees. The test weight shall be suspended from a position equal to the position of the outermost rung of the fly section or the center of the platform when so equipped. The aerial shall lift the test weight smoothly and evenly with no twisting or jerking. This test shall be performed at the normal hydraulic system relief valve setting. No temporary adjustments to the relief valve shall be allowed.
- 2) The completed apparatus shall be placed on a firm, level surface with the aerial ladder stabilizers extended and down. A test weight equal to 1.5 times the aerial's rated tip load

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capacity, shall be suspended from a position equal to the position of the outermost rung of the fly section (or center of the platform when so equipped), with the aerial in the straight-ahead position. The aerial shall then be rotated a full 360 degrees around the vehicle with the aerial at full extension and at 0 degrees elevation (or high enough to clear vehicle-mounted equipment). The aerial and vehicle shall show no signs of instability. This test shall be performed with no water in the tank, or hose, ladders, or removable equipment that would act as a counterbalance in order to simulate a worst-case condition.

3) The completed apparatus shall be placed on a firm surface having a minimum 5 degrees side slope with the aerial stabilizers extended and down. A test weight equal to 1.5 times the aerial's rated tip load capacity, shall be suspended from a position equal to the position of the outermost rung of the fly section (or center of the platform when so equipped), with the aerial in the straight-ahead position. The aerial shall then be rotated 90 degrees to the downhill side with the aerial at full extension, 0 degrees elevation (or high enough to clear vehicle-mounted equipment). The aerial and vehicle shall show no signs of instability, and all of the stabilizers shall remain firmly on the ground. This test shall be performed with no water in the tank, or hose, ladders, or removable equipment that would act as a counterbalance in order to simulate a worst-case condition.

4) The completed apparatus shall be placed on a firm, level surface with the aerial stabilizers extended and down. A test weight equal to 2.0 times the aerial's rated tip load capacity, shall be suspended from a position equal to the position of the outermost rung of the fly section (or center of the platform when so equipped), with the aerial in the straight-ahead position at full extension and at 8 degrees elevation (or high enough to clear vehicle-mounted equipment). After ten (10) minutes, the weight shall be removed, and the aerial shall be inspected for any abnormal twist or deflection.

5) The completed apparatus shall be placed on a firm, level surface with the aerial stabilizers extended and down. The aerial will be positioned at full extension at 0 degrees elevation at some position out of the travel rest and off the side or rear of the truck. For units without a pre-piped waterway to the tip, a test weight of 220# shall be applied horizontally and perpendicular to the tip of the aerial at the location of the outermost rung. The rotation brake shall not release nor shall the aerial's deflection exceed the manufacturer's accepted tolerances. For aerials with pre-piped waterways, a test weight of 350# will be applied at the location of water nozzle.

Upon satisfactory completion of all inspections and tests, an independent third-party inspection firm shall submit a certificate indicating that all specified standards have been met.

Third-Party Flow Test

A flow test shall be conducted to determine that the water system is capable of flowing 1,000 gpm at 100 psi nozzle pressure with the aerial device at full extension and elevation. When the aerial apparatus is equipped with a fire pump, the test shall be conducted using the onboard pump. Intake pressure for the onboard pump shall not exceed 20 psi.

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In addition to the flow test, a hydrostatic test shall be done on the waterway system. The permanent water system, piping, and monitor shall be hydrostatically tested at the maximum operating pressure required to flow 1,000 gpm at 100-psi nozzle pressure at maximum elevation and extension.

These results shall be certified by an independent, third party testing organization, per NFPA 16.13.1 through 16.13.1.3.

DOT Required Drive Away Kit

Three (3) triangular warning reflectors with carrying case shall be supplied to satisfy the DOT requirement.

EXTERIOR PAINT

Cab Paint

The apparatus cab shall be painted DuPont color L6572EG Red the paint shall be of the highest quality finish for low maintenance, long life, and attractive appearance. The finish shall consist of a corrosion-resistant primer, urethane high build primer, and high performance durable color coat. The vehicle finish shall be protected with a minimum of 2 mils film thickness of UV resistant clear coat.

The paint process shall meet or exceed current State regulations concerning paint operations. Pollution control shall include measures to protect the atmosphere, water and soil. Manufacturer shall, upon demand, provide evidence that the manufacturing facility is in compliance with State EPA rules and regulations.

The cab exterior shall have no mounted components prior to painting to assure full coverage of metal treatments and paint. Any vertically or horizontally hinged smooth-plate doors shall be painted separately to assure proper paint coverage on the cab, doorjamb, and door edges.

The paint process shall feature DuPont Performance Coatings high-solid, low VOC products and be performed in the following steps:

- Corrosion Prevention - all raw materials shall be pre-treated with the MetaLok-CVP system to provide superior corrosion resistance and excellent adhesion of the topcoat.
- DuPont Uro® Prime 1340S™ polyurethane primer shall be applied to guarantee excellent gloss holdout, chip resistance, and barrier coat corrosion protection.
- DuPont Imron® Elite Express System (Top coat) - a lead free, chromate-free, high-solids polyurethane color coat shall be applied. A minimum of two coats shall be applied providing excellent coverage and durability.
- DuPont High Solids Clear coat TC35000™ - a high-solids, low VOC clear coat shall be applied as the final step. To ensure full gloss, color retention and durability a minimum of two coats shall be applied at 2 mils film thickness minimum.

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Any location where a surface is penetrated after painting for the purpose of mounting steps, handrails, doors, lights, or other specified components shall be treated at the point of penetration with a corrosion inhibiting system. All hardware used in mounting steps, handrails, doors, lights, or other specified components shall be individually treated with the corrosion inhibiting system.

After the paint process is complete, the gloss rating of the unit shall be tested with a 20-degree gloss meter and distinction of image meter to assure a smooth mirror like finish.

Paint Cab Two Tone Color

The two-tone chassis cab shall be DuPont Imron™ Elite Express System polyurethane paint color 767681EG Black applied to the upper section of the cab.

Body Paint Finish

The apparatus body shall be painted DuPont color L6572EG Red. The paint shall be of the highest quality finish for low maintenance, long life, and attractive appearance. The finish shall consist of a corrosion-resistant primer, urethane high build primer, and high performance durable color coat. The vehicle finish shall be protected with a minimum of 2 mils film thickness of UV resistant clear coat.

The paint process shall meet or exceed current State regulations concerning paint operations. Pollution control shall include measures to protect the atmosphere, water and soil. Manufacturer shall, upon demand, provide evidence that the manufacturing facility is in compliance with State EPA rules and regulations.

The body exterior shall have no mounted components prior to painting to assure full coverage of metal treatments and paint. Any vertically or horizontally hinged smooth-plate compartment doors shall be painted separately to assure proper paint coverage on the body, doorjamb, and door edges.

The paint process shall feature DuPont Performance Coatings high-solid, low VOC products and be performed in the following steps:

- Corrosion Prevention - all raw materials shall be pre-treated with the MetaLok-CVP system to provide superior corrosion resistance and excellent adhesion of the topcoat.
- DuPont Uro®Prime 1340S™ polyurethane primer shall be applied to guarantee excellent gloss holdout, chip resistance, and barrier coat corrosion protection.
- DuPont Imron® Elite Express System (Top coat) - a lead free, chromate-free, high-solids polyurethane color coat shall be applied. A minimum of two coats shall be applied providing excellent coverage and durability.
- DuPont High Solids Clear coat TC35000™ - a high-solids, low VOC clear coat shall be applied as the final step. To ensure full gloss, color retention and durability a minimum of two coats shall be applied at 2 mils film thickness minimum.

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Any location where the metal is penetrated after painting for the purpose of mounting steps, handrails, doors, lights, or other specified components shall be treated at the point of penetration with a corrosion inhibiting system. The system shall be applied to the sheet metal or extrusions in all locations where the metal has been penetrated. All hardware used in mounting steps, handrails, doors, lights, or other specified components shall be individually treated with the corrosion inhibiting system.

After the paint process is complete, the gloss rating of the unit shall be tested with a 20-degree gloss meter and distinction of image meter to assure a smooth mirror like finish.

Painted Pump Module

The apparatus pump module(s) shall be painted job color. The paint shall be of the highest quality finish for low maintenance, long life, and attractive appearance. The finish shall consist of a corrosion-resistant primer, urethane high build primer, and high performance durable color coat. The vehicle finish shall be protected with a minimum of 2 mils film thickness of UV resistant clear coat.

The paint process shall meet or exceed current State regulations concerning paint operations. Pollution control shall include measures to protect the atmosphere, water and soil. Manufacturer shall, upon demand, provide evidence that the manufacturing facility is in compliance with State EPA rules and regulations.

The module(s) exterior shall have no mounted components prior to painting to assure full coverage of metal treatments and paint. Any vertically or horizontally hinged doors shall not be installed to assure proper paint coverage on the doorjamb and door edges.

The paint process shall feature DuPont Performance Coatings high-solid, low VOC products and be performed in the following steps:

- Corrosion Prevention - all raw materials shall be pre-treated with the MetaLok-CVP system to provide superior corrosion resistance and excellent adhesion of the topcoat.
- DuPont Uro®Prime 1340S™ polyurethane primer shall be applied to guarantee excellent gloss holdout, chip resistance, and barrier coat corrosion protection.
- DuPont Imron® Elite Express System (Top coat) - a lead free, chromate-free, high-solids polyurethane color coat shall be applied. A minimum of two coats shall be applied providing excellent coverage and durability.
- DuPont High Solids Clear coat TC35000™ - a high-solids, low VOC clear coat shall be applied as the final step. To ensure full gloss, color retention and durability a minimum of two coats shall be applied at 2 mils film thickness minimum.

Any location where the metal is penetrated after painting for the purpose of mounting steps, handrails, doors, lights, or other specified components shall be treated at the point of penetration with a corrosion inhibiting system. The system shall be applied to the sheet metal or extrusions in all locations where the metal has been penetrated. All hardware used in mounting steps,

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handrails, doors, lights, or other specified components shall be individually treated with the corrosion inhibiting system.

After the paint process is complete, the gloss rating of the unit shall be tested with a 20-degree gloss meter and distinction of image meter to assure a smooth mirror like finish.

Reflective Tape on Jacks

The four outriggers that protrude beyond the side of the body shall be striped with white reflective tape. The tape shall be visible from the front or rear of the unit.

Lettering and Graphics

A 6" NFPA compliant cab and body scotchlite stripe, and up to (100) encapsulated gold leaf letters shall be applied per fire department design.

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Statement of Warranty

1-Year Standard

The apparatus manufacturer shall provide a full 1-year standard warranty. All components manufactured by the apparatus manufacturer shall be covered against defects in materials or workmanship for a 1-year period. All components covered by separate suppliers such as engines, transmissions, tires, and batteries shall maintain the warranty as provided by the component supplier. A copy of the warranty document shall be provided with the proposal.

Lifetime Frame Warranty

The apparatus manufacturer shall provide a full lifetime frame warranty. This warranty shall cover all apparatus manufacturer designed frame, frame members, and crossmembers against defects in materials or workmanship for the lifetime of the covered apparatus. A copy of the warranty document shall be provided with the proposal. Frame warranties that do not cover crossmembers for the life of the vehicle shall not be acceptable.

10 Year/100,000 Mile Structural Warranty

The apparatus manufacturer shall provide a comprehensive 10-year/100,000-mile structural warranty. This warranty shall cover all structural components of the cab and/or body manufactured by the apparatus manufacturer against defects in materials or workmanship for 10 years or 100,000 miles, whichever occurs first. Excluded from this warranty are all hardware, mechanical items, electrical items, or paint finishes. A copy of the warranty document shall be provided with the proposal.

10 Year Stainless Steel Plumbing Warranty

The apparatus manufacturer shall provide a full 10-year stainless steel plumbing components warranty. This warranty shall cover defects in materials or workmanship of apparatus manufacturer designed foam/water plumbing system stainless steel components for 10 years. A copy of the warranty document shall be provided with the proposal.

10 Year Paint and Corrosion Warranty

The apparatus manufacturer shall provide a 10-year limited paint and corrosion perforation warranty. This warranty shall cover paint peeling, cracking, blistering, and corrosion provided the vehicle is used in a normal and reasonable manner. Paint shall be prorated for 10 years and corrosion perforation shall be covered 100% for 10 years. The warranty period shall begin upon delivery of the apparatus to the original user-purchaser. A copy of the warranty document shall be provided with the proposal.

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UV paint fade shall be covered in a separate warranty supplied by DuPont and shall be for a minimum of 10 years.

20 Year Aerial Device Structural

The aerial manufacturer shall provide a 20-year structural integrity warranty on the aerial device. This warranty shall cover structural components and shall be extended for a period of 20 years after the date on which the vehicle is delivered to the original purchaser. A copy of the warranty document shall be provided with the proposal. Please refer to warranty document for complete details and exclusions.

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Additional Equipment

Supply (1) pair of Worden wheel chocks
\$5,000 shelf/tray allowance
\$5,500 mounting allowance
\$3,000 miscellaneous bracket allowance
Supply/install mateflex dry deck flooring in each compartment
Supply (4) Koehler Responder handlights
Supply (2) rechargeable Mag-Lite #AB714
Supply (2) Elkhart #470 hydrant wrench sets with (2) T-464 & (1) S-454 wrenches
Supply (1) Hebert #G30102 5" hose clamp
Supply (6) Akron #10 spanner wrenches (2.5")
Supply (1) Akron #SS-MP "super spanner" wrench set
Supply (4) hose straps
Supply (10) #J858 12' x 18' vinyl salvage covers
Supply (2) Alco-Lite PEL-35 35' 2 section ladders
Supply (1) Alco-Lite PEL-28 28' 2 section ladder
Supply (1) Alco-Lite Pel-24 24' 2 section ladder
Supply (1) Alco-Lite PRL-20 roof ladder
Supply (1) Alco-Lite PRL-16' roof ladder
Supply (1) Alco-Lite PRL-12' roof ladder
Supply (1) Alco-Lite FL-10 10' folding ladder
Supply (3) Firehooks 6 lb. pickhead axes
Supply (2) Firehooks 6 lb. flathead axes
Supply (1) Firehooks 10 lb. Sledgehammer
Supply (2) Firehooks 8lb. Force flat axe
Supply (3) Fire Hooks Pro-bar 30" halligan
Supply (1) Firehooks K-tool
Supply (1) Firehooks 24" bolt cutters
Supply (3) Firehooks axe/halligan marrying straps
Supply (2) Firehooks 4' drywall hooks w/D handle
Supply (1) Firehooks 6' Boston rake w/ram knob
Supply (1) Firehooks 6' All Purpose hook w/ram knob
Supply (1) Firehooks 6' NY roof hook w/pry end
Supply (1) Firehooks 8' Boston rake w/ram knob
Supply (1) Firehooks 8' All Purpose hook w/ram knob
Supply (1) Firehooks 12' Boston rake w/ram knob
Supply (1) Firehooks 12' All Purpose hook w/ram knob
Supply (1) Firehooks 10' Boston rake w/ram knob
Supply (2) Fire Hooks Crow Bar - part #CBWP-51
Supply (2) heavy-duty 50' Fire Power extension cords
Supply (2) heavy-duty 100' Fire Power extension cords
Supply (1) rubber mallet
Supply (1) toolbox
Supply (4) flat shovels w/D handle

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Supply (1) 12 lb. Sledgehammer
Supply (1) 2.5 gallon H2O extinguisher
Supply (4) Firehooks EZ-Can #EZ-CB straps
Supply (1) 10 lb. Drychem extinguisher
Supply (1) 20 lb. Drychem extinguisher
Supply (1) 15 lb. CO2 extinguisher
Supply (4) Pac-Mule ultra ladder belts
Supply 150' life safety rope (1/2")
Supply (2) TFT #AB3ST-NX 6" Female Swivel x 5" Storz Ball Intake Valves
Supply (3) TFT #AA4ST-SP 5" storz x 4" storz adapters
Supply (1) TFT #AA3H-ST-NT 5" FNST x 5" storz adapter
Lettering to match Fire Department design
NFPA compliant chassis/body scotchlite stripe
Install dept. supplied radio antenna

Add Options:

The following items shall be priced separately and may be accepted or rejected at the discretion of the Rochester Fire Department:

PRE-PAYMENT ALTERNATIVES

Payment Amount

Credit

One year extended warranty _____

2nd Platform Monitor – Akron 3570 two-wheel manual monitor with an Akron 5160 straight stream to fog nozzle. The monitor shall have a horizontal sweep of 90 degrees (67.5 degrees out, 22.5 degrees in) and a vertical sweep of 75 degrees (30 degrees above and 45 degrees below horizontal). The monitor shall be able to operate in the horizontal and vertical axis simultaneously. The manual monitor and nozzle shall be capable of discharging 250-1000 gpm at 80-psi nozzle pressure. The monitor shall be mounted at the center front of the platform, offset to the right and be operated from inside the platform.

Supply (3) TFT #HM-VPGI-IF midmatic x 1.5" NPSH nozzles _____

Supply (1) TFT #HD-2VPGI Duel-Force x 2.5" NH nozzle _____

Supply (3) Fire Research #FCA700-S50 500 watt portable quartz lights w/Fire Power ends

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Supply (1) SuperVac 20" #M910A smoke ejector w/Fire Power end _____

Supply (1) Petrogen #PCS 6000 portable cutting system _____

Supply 400' of Neidner 1.75" attack hose (blue - 50' lengths) _____

Supply 200' of Neidner 2.5" attack hose (red - 50' lengths) _____

Supply 500' of Neidner 5" LDH hose (5" storz couplings - 100' lengths) _____

Supply 100' of Neidner 5" LDH hose (5" storz couplings - 50' lengths) _____

(2) Firecom headsets – Model # UH-10 _____

(1)Ferno Washington model #71 stokes basket _____

(1) Rear and Side view back-up Camera Model to be determine