Publish Friday, May 5 2023

LEGAL NOTICE
NOTICE TO BIDDERS

The City of Wilder, KY will receive sealed bids **Friday, May 26, 2023, at 1:00 p.m.** local time at the City Building, 520 Licking Pike, Wilder, KY 41071 for the purchase of a **78 FOOT CUSTOM BUILT AERIAL QUINT FIRE APPARATUS.** The specifications are available at the Wilder City Building during the hours of 8:00 a.m. to 4:00 p.m. Monday -Friday.

Each sealed bid shall be accompanied by either a cashier's check or satisfactory bid bond, in a sum, which is not less than five (5%) percent of the aggregate amount of the bid, payable to the City of Wilder. Successful bidder will be required to execute and provide a performance bond for security of an amount not less than one hundred percent of the bid.

Digital specifications are available on the City of Wilder web page at wilderky.gov, in PDF format or hard copies, may be picked up at the city building starting Friday, May 5, 2023, at the front desk or by calling Chief Doug Neyman at 859-431-5884.

The City will evaluate all submitted bids in accordance with resident bidder preferences pursuant to KRS 45A.490-494." The City reserves the right to reject any and all bids.

Signed: _____

Juanita Schultz, City Clerk
City of Wilder
520 Licking Pike
Wilder, KY 41071

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45A.490 Definitions for KRS 45A.490 to 45A.494.

As used in KRS 45A.490 to 45A.494:

(1) "Contract" means any agreement of a public agency, including grants and orders, for the purchase or disposal of supplies, services, construction, or any other item; and

(2) "Public agency" has the same meaning as in KRS 61.805.

Effective: July 15, 2010

History: Created 2010 Ky. Acts ch. 162, sec. 1, effective July 15, 2010.

45A.492 Legislative declarations.

The General Assembly declares:

(1) A public purpose of the Commonwealth is served by providing preference to Kentucky residents in contracts by public agencies; and

(2) Providing preference to Kentucky residents equalizes the competition with other states that provide preference to their residents.

Effective: July 15, 2010

History: Created 2010 Ky. Acts ch. 162, sec. 2, effective July 15, 2010.

45A.494 Reciprocal preference to be given by public agencies to resident bidders -- List of states -- Administrative regulations.

(1) Prior to a contract being awarded to the lowest responsible and responsive bidder on a contract by a public agency, a resident bidder of the Commonwealth shall be given a preference against a nonresident bidder registered in any state that gives or requires a preference to bidders from that state. The preference shall be equal to the preference given or required by the state of the nonresident bidder.

(2) A resident bidder is an individual, partnership, association, corporation, or other business entity that, on the date the contract is first advertised or announced as available for bidding:

(a) Is authorized to transact business in the Commonwealth; and

(b) Has for one (1) year prior to and through the date of the advertisement, filed Kentucky corporate income taxes, made payments to the Kentucky unemployment insurance fund established in KRS 341.490, and maintained a Kentucky workers' compensation policy in effect.

(3) A nonresident bidder is an individual, partnership, association, corporation, or other business entity that does not meet the requirements of subsection (2) of this section.

(4) If a procurement determination results in a tie between a resident bidder and a nonresident bidder, preference shall be given to the resident bidder.

(5) This section shall apply to all contracts funded or controlled in whole or in part by a public agency.

(6) The Finance and Administration Cabinet shall maintain a list of states that give to or require a preference for their own resident bidders, including details of the preference given to such bidders, to be used by public agencies in determining resident bidder preferences. The cabinet shall also promulgate administrative regulations in accordance with KRS Chapter 13A establishing the procedure by which the preferences required by this section shall be given.

(7) The preference for resident bidders shall not be given if the preference conflicts with federal law.

(8) Any public agency soliciting or advertising for bids for contracts shall make KRS 45A.490 to 45A.494 part of the solicitation or advertisement for bids.

Effective: July 15, 2010

History: Created 2010 Ky. Acts ch. 162, sec. 3, effective July 15, 2010.

City of Wilder Fire Department
522 Licking Pike
Wilder, KY 41071

REQUEST FOR BIDS
Custom 78' Aerial Ladder Quint

SECTION I
BID INSTRUCTIONS AND GENERAL REQUIREMENTS

INTENT OF SPECIFICATIONS

It is the intent of these specifications to define and describe the minimum requirements for one (1) Custom 78' Aerial Ladder Quint , hereinafter referred to as the "fire apparatus" or "apparatus". These specifications are not intended to be proprietary and all manufacturers are encouraged to bid. All exceptions and clarifications will be considered as long as they meet the intent of the specifications.

The Purchaser wishes to secure apparatus built to withstand the severe and continuous use encountered in emergency firefighting and rescue service, by experienced and reputable builders of automotive fire apparatus, hereinafter referred to as the "apparatus manufacturer" or manufacturer". These specifications cover the general requirements as to the design, type of construction, and test to which the apparatus must conform; together with certain details as to layout, manufacture, finish, equipment, and appliances to be furnished. Minor details of construction and materials where not otherwise specified are left to the discretion of the apparatus manufacturer, who shall be solely responsible for the design and construction of all features.

The apparatus shall be new and unused, and conform to the best practices known to the trade in design, quality of materials, and workmanship for the apparatus type described. It shall be symmetrically proportioned and constructed with due consideration of the load to be carried on each axle. Special consideration shall be given ease of operation in both driving and pumping, and accessibility to various areas requiring periodic maintenance. All parts not specifically mentioned herein, but which are necessary to furnish a complete fire apparatus, shall be furnished and shall conform to the best practices known in up-to-date fire apparatus design. The apparatus shall be furnished with the manufacturer's standard equipment for that style and type apparatus, unless specifically eliminated by these specifications

The Purchaser does not intend to consider bids or proposals on prototype, experimental, or unproven types of apparatus.

COMPLIANCE STANDARDS

The National Fire Protection Association Pamphlet 1901, latest edition, entitled "Standard for Automotive Fire Apparatus" is hereby adopted and made a part of these specifications the same as if they were written out in full insofar as they apply. The only

be Carried on" the various types of apparatus, where the bidder shall furnish only that equipment specifically listed in these specifications.

The apparatus shall further conform to all Federal Motor Vehicle Safety Standards without exception.

RESPONSIBILITY OF THE BIDDER

Any bidder who does not understand any portion of these specifications and or the requirements, or who wishes to present a question on same, shall do so in writing. **Verbal answers shall not be binding.**

ADDENDUMS AND INTERPRETATIONS

No interpretation of the meaning of these specifications or other bid documents shall be made to any bidder verbally. All requests for interpretation of the bid package shall be made in writing and addressed to the Purchaser, and shall be received no later than seven (7) days prior to the bid opening date to be given consideration.

Any and all such interpretations, and any supplemental instructions, shall be issued in the form of a written addendum to the specifications which, if issued, shall be mailed or otherwise communicated to all prospective bidders no later than five (5) days prior to the date fixed for the opening of bids. Failure to include any such addendums or interpretations shall not relieve any bidder from any obligation under their bid as submitted. Any questions to the specifications may be addressed to the designated representative of the Purchaser.

FAMILIARITY WITH LAWS

The bidder is presumed to be familiar with all Federal, State and Local laws, ordinances, code rules and regulations that may in any way affect this contract. Ignorance on the part of the bidder shall in no way relieve the bidder from responsibility to comply with these specifications.

SINGLE SOURCE MANUFACTURING

In order to protect the Purchaser from divided warranty responsibility between chassis and body manufacturers, proposals will only be accepted from apparatus builders who design, fabricate, and assemble the complete apparatus at their own facilities. This shall include the cab shell, chassis assembly, aerial device (if applicable), and complete body structure. Private labeling of another manufacturer's chassis will not meet the requirements of this section. No exception.

TEST FACILITIES

The apparatus, prior to acceptance, will be required to meet the performance tests of the applicable NFPA Automotive Fire Apparatus Standard. As such, each bidder shall have the facilities to perform these tests at the manufacturing site. These tests shall include, but not be limited to: acceleration, braking and G-loading tests using a fifth wheel device, all specified pump tests, a 20 percent brake hold test, and turn radius tests.

If the manufacturer does not have the facilities to perform any of the above tests, the manufacturer shall contract with an outside agency to have these tests performed on this apparatus. No exceptions shall be allowed on these performance tests.

ISO COMPLIANCE

The manufacturer shall operate a Quality Management System meeting the requirements of ISO 9001:2008.

The International Organization for Standardization (ISO) is a recognized world leader in establishing and maintaining stringent manufacturing standards and values. The manufacturer's certificate of compliance affirms that these principles form the basis for a quality system that unswervingly controls design, manufacture, installation, and service.

The manufacturer's quality systems shall consist of, but not be limited to, all written quality procedures (aka QOP) and other procedures referenced within the pages of the manufacturer's Quality Manual, as well as all Work Instructions, Workmanship Standards, and Calibration Administration that directly or indirectly impacts products or processes. In addition, all apparatus assembly processes shall be documented for traceability and reference. The manufacturer shall also engage the services of a certified third party for testing purposes where required.

If the manufacturer operates more than one manufacturing facility each facility must be ISO certified.

By virtue of its ISO compliance the manufacturer shall provide an apparatus that is built to exacting standards, meets the customer's expectations, and satisfies the customer's requirements.

A copy of the manufacturer's certificate of ISO compliance for each manufacturing facility shall be provided with the bid.

LIABILITY

The successful bidder shall defend any and all suits and assume all liability for the use of any patented process, device or article forming a part of the apparatus or any appliance furnished under the sales contract.

EXCEPTIONS AND DEVIATIONS:

The apparatus specifications issued by the Purchaser are considered minimum design and construction standards against which the apparatus will be inspected, and it is the intent to receive proposals on equipment/apparatus meeting the attached detailed specifications in their entirety.

Any proposal being submitted without "Full Compliance" with these specifications, including the "Bid Instructions and General Requirements", shall so state on the bid proposal page, followed by a detailed "List of Exceptions/Clarifications" stating the areas of non-compliance. The reference must include page number, paragraph, and the exact nature of the exception.

Failure to follow this format will render the vendor's proposal non-responsive and subject to rejection.

Any exception or deviation from the specifications will be fully evaluated by the Purchaser. It is therefore in the best interest of the Bidder to explain and justify in detail any exception or deviation taken, as well as to list and bring attention to areas that exceed the specification. In the absence of any stated exception or deviation on the list of exceptions, the proposal and furnished apparatus will be expected to meet or exceed each specification, term, and condition. **A general statement taking "total exceptions" to the specifications shall cause immediate rejection of the bid.**

Where the specifications list a specific, commonly available item by manufacturer or trade name, or choice of manufacturers and models, the specific item or one of the listed choices are to be included without exception in the base bid. Alternates to the standard(s) specified may be recommended by the bidder on a separate "Options" page, along with the corresponding add or deduct price.

Where the specifications list an item by manufacturer or vendor followed by the terms "or acceptable alternate", "equivalent to", or "equal", this is done for the express purpose of establishing a basis of design, construction, quality, durability and operational characteristics, and not for the purpose of limiting competition. Where the apparatus manufacturer intends to supply other than the listed item, the proposed alternate shall be listed on the "List of Exceptions", and noted as an "equal substitution".

All proposals will be considered and evaluated against the specifications and needs of the Purchaser. Submissions by the bidder, previous experience of the Purchaser, as well as information gained from contacting current and previous users of the equipment being evaluated will all be considered when establishing the acceptability of exceptions or alternates. The Purchaser shall be the sole determining authority in judging the acceptability of exceptions or alternates.

WARRANTY

The Bidder shall provide complete warranty information with their proposal, including the warranty terms offered for the major components of the apparatus. To prevent the problems of "Divided Responsibilities", the successful Bidder shall coordinate all warranty claims.

LOCAL DEALER

To assure the purchaser that prompt, professional and accurate representation is made on behalf of the manufacturer, there shall be a factory authorized sales and service dealer within 25 miles from the Purchaser. This dealer shall be competent and knowledgeable with respect to the sales and service of the emergency apparatus that the manufacturer produces. The local dealership shall attend all contract review meetings, pre-construction meetings, inspection trips, and completed unit delivery to the Purchaser.

The Purchaser places a very high priority on service and it is the intent of the Purchaser to assure that parts and service are readily available for the equipment specified. Service capabilities will be one of the criteria for award of this contract.

The dealership shall have authorized service technicians who are completely trained in the servicing and maintenance of the apparatus offered. The bidder's service center shall have a fully enclosed and heated facility which shall be located within a reasonable distance of the fire station where the apparatus proposed will be housed after delivery. The bidder's authorized service center shall have a minimum of two fully equipped service vehicles which shall carry spare parts and repair equipment needed to work on the apparatus proposed.

Each bidder shall supply, with their proposal, detailed information on the bidder's ability to perform routine and emergency service on the apparatus after delivery. Detailed information shall be provided on service facilities, personnel, and service vehicles. Bidder shall state the number of miles from the Purchaser's facility to the nearest fully staffed repair facility operated by the bidder. The local service center shall be available for an inspection by designated representatives of the Purchaser prior to bid award.

Past experience of the Purchaser in working with the Bidder, or the Bidders representative shall also be considered in awarding this bid.

DELIVERY

Bid price shall include delivery to the Purchaser at the Purchaser's Fire Headquarters, serviced and ready for use except for installation by the Purchaser of Purchaser furnished and installed equipment.

The number of calendar days after award of contract in which the apparatus manufacturer promises to deliver a completed apparatus meeting the specifications shall be indicated on the Form of Proposal, and may be a factor in award. This promised maximum delivery time will be included in the contract.

PRE-DELIVERY CHECKLIST

The following shall be completed prior to delivery to the Purchaser:

1. Clean and detail: Eliminate air and water leaks, remove all metal shavings, tighten an secure any loose hardware, correct all paint scratches or paint chips.

2. Check all operations: Test acceleration and braking to NFPA requirements; check and record turning radius and delivered weight less personnel; eliminate any driveline vibration through all speeds; check HVAC system(s).

3. Check pump and plumbing (when so equipped): Operation to NFPA requirements; pressure relief control and operation; control and operation of all levers, gauges, and switches; eliminate all plumbing leaks; check priming system.

4. Electrical: Check of all circuits, switches, warning lamps and buzzers; engine gauges in cab and elsewhere on the apparatus.

The Purchaser shall be given notice that the apparatus is ready for inspection prior to delivery. It shall be the Purchaser's option to inspect the apparatus at the bidder's local service facility prior to delivery.

SUBMISSION OF BIDS

Bids will be addressed and submitted in accordance with the instructions provided with these specifications. The words "Fire Apparatus Proposal", the date, and bid opening time shall be stated on the front of the bid envelope.

Bidders are required to return this bid package as part of their bid proposal. Failure to include this shall cause immediate rejection of the proposal. Proposals that contain any omissions, erasures, or alterations, or that contain additions or items not called for in the bid documents, or that contain irregularities of any kind, shall not be considered. All signatures shall be in writing, and no proposal shall be considered unless so signed.

Bids shall be submitted only in the format hereinafter set forth and on the forms attached if provided. Any bid not in accordance with these instructions, in the form prescribed, or not completing all statements on the bid forms, shall be cause for rejection.

It shall be the responsibility of the bidder to assure that their proposal arrives at the location and time indicated. Late proposals, telegrams, facsimile, or telephone bids will not be considered. No exception.

The bid price shall be good for a period of sixty (60) days from the date of the bid opening.

PAYMENT TERMS

The payment terms to be assumed for the Base Bid shall be for a straight purchase with no down payment and the full purchase price paid by the Purchaser (or a financial institution/lease company of the Purchaser's choosing) upon delivery and acceptance by the Purchaser of the completed apparatus.

Any requirement for partial payment prior to delivery as part of the base bid, or any discounts from the base bid available to the Purchaser in consideration of a down payment, payment upon delivery of chassis to the apparatus manufacturer, or other partial payment schedule prior to delivery and acceptance shall be fully enumerated by the bidder and submitted with their proposal for consideration by the Purchaser.

TAXES

The bid price shall not include any local, State, or Federal taxes. The Bidder shall not be liable for any State or Federally mandated tax or program after the sale of this apparatus.

INSURANCE

Each bidder shall furnish, with their proposal, a Certificate of Product Liability Insurance for a minimum of ten (10) million dollars. Failure to provide this documentation shall render the proposal non-responsive and the bid shall be rejected. This certificate shall be from the prime builder only. Certificates submitted from various sub-contractors in order to total the ten million dollar minimum will not be acceptable as meeting the requirements of this section.

The Certificate must be made out to the Purchaser and must be original. Submission of a non-original Certificate, or a Certificate provided that is not made out to the Purchaser, will not meet the requirements of this section.

BID BOND REQUIREMENTS

A bid security in the form of a Bid Bond, cashier's check, or certified check made payable to the Purchaser in the amount of ten percent (10%) of the total bid shall be required. This shall serve as a guarantee which may be forfeited and retained by the Purchaser in lieu of its other legal remedies if a successful bidder's proposal is accepted by the Purchaser and the bidder shall fail to execute and return to the Purchaser the required contract and bonds within ten (10) days after notice of award. If a Bid Bond is provided, it shall be issued by a bonding company licensed to bond in this State.

MANUFACTURERS SPECIFICATIONS AND LITERATURE

Each bid must be accompanied by a set of manufacturer's specifications providing a detailed description of the apparatus and equipment proposed. These specifications shall include size, location, type, and model of all component parts being furnished, and detailed information on all materials used to construct all facets of the cab and apparatus body, and proposal specifications should be in the same format and general order as the advertised specification for ease of comparison.

Any bidder who fails to submit detailed construction specifications, or who photo copies and submits these specifications as their own construction details will be considered non-responsive and shall render their proposal ineligible for award. No exception.

APPARATUS DRAWINGS

Engineered drawings of the proposed apparatus are required with the bid. These drawings shall be an important tool in evaluating the bids. They shall also insure that the purchaser understands the apparatus being proposed by the bidder. These drawings shall depict the driver's side, passenger's side, front, and rear views. **Bids submitted without proposal drawings shall not be accepted.**

USER'S LIST

The Bidder shall provide the name, address, contact person and telephone number of at least twenty (20) similar units that have been manufactured and delivered to customers within the United States, preferably within the Midwest, with the bid proposal.

BID AWARD

It is the intention of the Purchaser to evaluate proposals and make an award to the bidder whose proposal, in the sole judgment of the Purchaser, offers the fire apparatus that provides best combination of design, operational characteristics, and value over the projected life of the apparatus. Evaluation criteria shall include but not be limited to:

1. Compliance with the Purchaser's specifications.
2. Functional design of proposed fire apparatus.
3. Perceived quality of workmanship, materials, and components proposed for construction of the apparatus.
4. Warranties offered.
5. Bid price.
6. Bidder's ability to support the apparatus over its effective service life.

The Purchaser reserves the right to waive any technicalities or irregularities; to accept or reject any or all bid proposals; and to purchase the apparatus and equipment it deems most suitable to its needs.

PRE-CONTRACT CONFERENCE

A meeting shall be held at the Purchaser's facility prior to the contract signing for a thorough review and comparison of the Purchaser's bid specifications with the Bidder's detailed response, to ensure that all aspects of Purchaser's requirements have been addressed by the Bidder. The Bidders specifications submitted with the bid shall be reviewed, annotated as required, initialed by the Bidder and Purchaser, and become part of the Contract.

PRE-CONSTRUCTION CONFERENCE

Purchaser, at their option, may request a meeting with manufacturer's representative after the order has been submitted to review the specifications, details, and drawings with the manufacturer, answer any outstanding questions or issues, and provide an opportunity for the Purchaser to make final approvals. The meeting shall be held prior to the commencement of any work being done on the chassis or the apparatus. Unless otherwise stated in these specifications, this meeting shall be held at the Purchaser's Fire Headquarters.

INSPECTION

Purchaser, at their option, may conduct a mid-build and/or final inspection of the apparatus at the manufacturer's plant. Unless otherwise stated in these specifications, travel, lodging, and meal expenses for the Purchaser's representatives shall be at the expense of the Purchaser.

BIDDERS AFFIDAVIT

Failure to sign and return this affidavit shall be grounds for immediate rejection of the bid.

I _____, as the authorized agent for_____

_____do hereby attest and affirm that the following information is true and that the proposal submitted by our firm complies with the general instructions, requirements, and specifications contained in this bid submission, except where indicated below.

Yes _____No _____ All pages of the General Instructions Requirements and Specifications have been received and reviewed.

Yes _____ No _____ All questionnaires, and blanks have been accurately filled in.

Yes _____ No _____ A properly executed Bid Bond is enclosed.

Yes _____ No _____ The apparatus offered (cab, chassis, body (aerial if applicable)) is manufactured by a single fire apparatus builder in North America.

Yes _____ No _____ Bidder complies with bid specifications without exception.

Yes _____ No _____ Bidder complies with Design Criteria.

Yes _____ No _____ Apparatus proposed complies with dimensional requirements.

Yes _____ No _____ The apparatus proposed is not a prototype.

Yes _____ No _____ The performance tests shall be performed in compliance with the specifications and all applicable standards.

Yes _____ No _____ A complete copy of the bidder's detailed proposal is included.

Yes _____ No _____ A separate list of exceptions is attached.

Yes _____ No _____ All specified warranties included.

Yes _____ No _____ All proposed warranties are in compliance with specifications.

Yes _____ No _____ Bidder has included Apparatus Drawings per specifications.

Yes _____ No _____ The Bidder provides for training of personnel as described.

Yes _____ No _____ The proposed apparatus and equipment are new and unused.

Delivery of the apparatus shall take place within _____ calendar days after the execution and acceptance of a contract and/or approved purchase order.

Authorized Agent Information:

Name (printed):

_____.

Address:

_____.

_____.

Contact person:

_____.

Phone: _____.

Agent's Signature and Date:

_____.

Manufacturer:

Name (printed):

_____.

Address:

_____.

_____.

Phone: _____.

City of Wilder Fire Department
522 Licking Pike
Wilder, KY 41071

REQUEST FOR BIDS
Custom 78' Aerial Ladder Quint

SECTION II
DETAILED SPECIFICATIONS

TESTING COMPLIANCE STANDARD

NFPA Compliance

The apparatus manufacturer supplied components of the apparatus shall be compliant with NFPA 1901, 2016 edition.

Overall Height Restriction

The apparatus shall an overall height not to exceed 11' 8".

Overall Length Restriction

The apparatus shall have an overall length not to exceed 37' 3".

Cab Crashworthiness Requirement

The apparatus cab shall meet and/or exceed relevant NFPA 1901 load and impact tests required for compliance certification with the following:

Side Impact Dynamic Pre-Load per SAE J2422 (Section 5).

Testing shall meet and/or exceed defined test using 13,000 ft-lbs of force as a requirement. The cab shall be subject to a side impact representing the force seen in a roll-over. The cab shall exhibit minimal to no intrusion into the cab's occupant survival space, doors shall remain closed and cab shall remain attached to frame.

Cab testing shall be completed using 13,776 ft-lbs of force **exceeding** testing requirements.

Quasi-static Roof Strength (proof loads) per SAE J2422 (Section 6) / ECE R29, Annex 3, paragraph 5.

Testing shall meet and/or exceed defined test using 22,046 lbs of mass as a requirement. Testing shall be completed using platen(s) distributed uniformly over all bearing members of the cab roof structure.

Cab testing shall be completed using 23,561 lbs of mass **exceeding** testing requirements. The cab shall exhibit minimal to no intrusion into the cab's occupant survival space and doors shall remain closed.

Additional cab testing shall be conducted using 117,336 lbs of mass **exceeding** testing requirements by **over five (5) times**. The cab shall exhibit minimal to no intrusion into the cab's occupant survival space and the doors shall remain closed.

Frontal Impact per SAE J2420.

Testing shall meet and/or exceed defined test using 32,549 ft-lbs of force as a requirement. The cab shall be subject to a frontal impact as defined by the standard. The cab shall exhibit minimal to no intrusion into the cab's occupant survival space, doors shall remain closed and cab shall remain attached to frame.

Cab testing shall be completed using 34,844 ft-lbs of force **exceeding** testing requirements.

Additional cab testing shall be conducted using 65,891 ft-lbs of force **exceeding** testing requirements by **over two (2) times**.

The cab shall meet all requirements to the above cab crash worthiness; **NO EXCEPTIONS**.

A copy of a certificate or letter verifying compliance to the above performance by an independent, licensed, professional engineer shall be provided upon request.

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

Seat Mounting Strength

The cab seat mounting surfaces shall be third party tested and in compliance with FMVSS 571.207.

Seat Belt Anchor Strength

The cab seat belt mounting points shall be third party tested and in compliance with FMVSS 571.210.

Equipment Capacity

Equipment allowance on the apparatus shall be 2500 lbs. This allowance is in addition to the weight of the hoses and ground ladders listed in the shop order as applicable.

ISO Compliance

The manufacturer shall ensure that the construction of the apparatus shall be in conformance with the established ISO-compliant quality system. All written quality procedures and other procedures referenced within the pages of the manufacturer`s Quality Manual, as well as all Work Instructions, Workmanship Standards, and Calibration Administration that directly or indirectly impacts this process shall be strictly adhered to. By virtue of its ISO compliance the manufacturer shall provide an apparatus that is built to exacting standards, meets the customer`s expectations, and satisfies the customer`s requirements.

BUMPERS

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.

Front Bumper Extension

The bumper shall be extended approximately 20" from the face of the cab as required.

Bumper Gravel Shield

The extended front bumper gravel shield shall be made of 3/16" (.375") aluminum tread plate material.

BUMPER TRAYS

Bumper Tray - Center

A hose tray constructed of 1/8" aluminum shall be recessed into the front bumper extension. The tray shall be located in the center of the bumper and be approximately 14" deep (13" to the top of the slats). 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.

Lid, Bumper Hose Tray

The center bumper tray shall have a diamond plate lid. The lid shall be hinged and include a latch, rubber seal and held open with a pneumatic shock.

FRAME ASSEMBLY

Frame Assembly

The frame shall consist of two (2) C-channel frame rails with heavy-duty crossmembers. Each frame rail shall have the following minimum specifications in order to minimize frame deflection under load and thereby improve vehicle ride and extend the life of the frame:

Dimensions: 12" x 3-1/2" x 3/8"

Material: 110,000-psi minimum yield strength, high strength, low alloy steel

Section Modulus: 20.90 cu. in.

Resisting Bending Moment (RBM): 2,299,000 in. lbs.

There shall be a minimum of six (6) crossmembers joining the two (2) frame rails in order to make the frame rigid and hold the rails/liners in alignment. The crossmembers shall be a combination of a formed steel C-channel design along with heavy duty steel fabricated designs as required for the exact chassis configuration. The crossmembers shall be attached to the frame rails with not less than four (4) bolts at each end arranged in a bolt pattern to adequately distribute the crossmember load into the rail/liner and minimize stress concentrations.

All frame fasteners shall be high-strength, Grade 8, flanged-head threaded bolts and nuts for frame strength, durability, and ease of repair. The nuts shall be Stover locknuts to help prevent loosening. The frame fasteners shall be tightened to the proper torque at the time of assembly.

The frame rails shall be hot-dip galvanized and powder coated for improved corrosion resistance. The galvanization shall be a minimum of 4 mils thick and done in accordance with ASTM A123. The powder coat shall be 6.5 mils thick (+/- 1.5 mils) and pass ASTM D3359 testing.

The frame crossmembers and frame-mounted components (suspensions, axles, air tanks, battery boxes, fuel tank, etc.) shall be painted black.

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 upon request.

Frame Liner

A 11-1/8" x 3-1/8" x 3/8" channel frame liner shall be bolted to each frame rail for added strength and rigidity. Frame liners shall be made of 110,000-psi minimum yield, high strength, low alloy steel. The frame rail liners shall be hot-dip galvanized and powder coated for improved corrosion resistance. The galvanization shall be a minimum of 4 mils thick and done

in accordance with ASTM A123. The powder coat shall be 6.5 mils thick (+/- 1.5 mils) and pass ASTM D3359 testing.

Each 12" frame rail with liner shall have the following minimum characteristics:

Section Modulus: 36.62 cu. in.

Resisting Bending Moment (RBM): 4,028,000 in. lbs.

The frame liners shall be inserted inside the open portion of the frame rails and shall run continuously from the rear of the frame to the centerline of the front axle to provide maximum frame strength at all critical load points.

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 down below the bumper / cab.

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.

Coated Fasteners

The custom chassis frame assembly shall be assembled using GEOMET 720 coated fasteners for corrosion resistance.

AXLE OPTIONS

Front Axle

The vehicle shall utilize a Dana D-2200W drop beam front axle with a rated capacity of 22,800 lbs. It shall have 71" kingpin centers. The axle shall be of I-beam construction and utilize grease-lubricated wheel bearings. The vehicle shall have a nominal cramp angle of 42 degrees, plus two (+ 2) degrees to minus three (- 3) degrees including front suction applications.

The front axle hubs shall be made from ductile iron and shall be designed for use with 10 hole 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. The springs shall have Berlin style eyes and rubber bushings on each

end with an additional standard wrap at the front eye. The capacity shall be 23,000 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 23,000 lbs. Relief stops shall be provided to reduce system pressure upon full wheel cut. The system shall operate mechanically should the hydraulic system fail.

Shock Absorbers Front

Koni model 90 shock absorbers shall be provided for the front axle. The shocks shall be three way adjustable.

The shocks shall be covered by the manufacturer`s standard warranty.

Front Axle Sight Glass

The front axle shall have a Stemco sight glass on the hubs to check the lubricant level of the axle spindles.

The inboard wheel seals shall be Chicago Rawhide brand (or equivalent).

Rear Axle

The vehicle shall utilize an Meritor RS-30-185 single rear axle with single reduction hypoid gearing and a manufacturer`s rated capacity of 33,000 lbs. The axle shall be equipped with oil-lubricated wheel bearings with Meritor oil seals.

The rear axle hubs shall be made from ductile iron and shall be designed for use with 10 hole hub-piloted wheels to improve wheel centering and extend tire use.

Rear Suspension

The rear suspension shall be a Reyco model 79KB. The suspension shall include linear-rate slipper type leaf springs that eliminate spring eyes and shackles. The suspension shall also include auxiliary "helper" leaf springs, one (1) fixed torque arm, one (1) adjustable torque arm and cast spring hangers. The suspension shall be rated for 33,000 lbs.

WHEELS

Front Wheels

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

The wheel shall have a load rating of up to 11,000 lbs. each (up to 11,400 lb rating available with speed limited to 60 MPH)

Rear Wheels

The vehicle shall have four (4) Accuride polished (on outer wheel surfaces only) aluminum disc wheels. They shall be forged from one-piece corrosion-resistant aluminum alloy and sized appropriately for the tires.

Front Wheel Trim Package

The front wheels shall have stainless steel lug nut covers (for use with aluminum wheels) or chrome plated plastic (for use with steel wheels). The front axle shall be covered with American made Real Wheels brand mirror finish, 304L grade, non-corrosive stainless steel universal baby moons. All stainless steel baby moons shall carry a lifetime warranty plus a 2 year re-buffing policy. There shall be two (2) baby moons and twenty (20) lug nut covers.

Rear Wheel Trim Package, Single Axle

The rear wheels shall have stainless steel lug nut covers (chrome plated steel lug nut covers not acceptable), or American made chrome plated plastic lug nut covers. The rear axle shall be covered with American made Real Wheels brand mirror finish, 304L grade, non-corrosive stainless steel, spring clip band mount high hats, DOT user friendly. All stainless steel high hats shall carry a lifetime warranty plus a 2 year re-buffing policy. There shall be two (2) high hats and twenty (20) lug nut covers.

Valve Stem Extensions

Each inside rear wheel on the rear axle shall have valve extensions.

TIRES

Front Tires

The front tires shall be two (2) Michelin 425/65R22.5 tubeless type 20 PR radial tires with XZE highway tread.

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

Max front rating 22,800 @ 68 mph (Intermittent fire service max speed rating 75 MPH).

Max front rating with Alco aluminum wheels - 24,400 @ 65 MPH (intermittent fire service rating if GAW is over 22,800)

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

Rear Tires

The rear tires shall be Michelin 315/80R22.5 tubeless type radial tires with XDN2 GRIP all weather tread.

The tires with wheels shall have the following weight capacity:

33,080 lbs. (dual) @ 75 MPH. (Intermittent fire service max load 35,396 lbs)

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

Tire Pressure Indicators

The apparatus shall be provided with Real Wheels AirGuard LED tire pressure indicating valve stem caps. When the tire is under inflated by 5-10 PSI, the LED indicator on the cap shall flash red. The indicator housings shall be shock resistant and constructed from polished stainless steel. The indicators shall be calibrated by attaching to valve stem of a tire at proper air pressure per load ratings and easily re-calibrated by simply removing and re-installing them during service.

BRAKE SYSTEMS

Front Brakes

The front axle shall be equipped with Dana / Bendix ADB22X 17 inch disc brakes.

A 3 year/unlimited miles parts and 3 year labor brake warranty shall be provided as standard by Dana. The warranty shall include bushings and seals.

Rear Brakes

The rear axle shall be equipped with ArvinMeritor 16.5" x 8.625" P-Cast S-cam brakes with cast brake shoes. The brakes shall be furnished with Haldex 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.

Brake System

The vehicle shall be equipped with air-operated brakes and an anti-lock braking system (ABS). The brake system shall meet or exceed the design and performance requirements of the current Federal Motor Vehicle Safety Standard (FMVSS)-121, and the test requirements of the current NFPA 1901 Standard.

A dual-treadle brake valve shall correctly proportion the braking power between the front and rear systems. The air system shall be provided with a rapid pressure build-up feature, designed to meet current NFPA 1901 requirements, to allow the vehicle to begin its emergency response as quickly as possible.

A pressure-protection valve shall be installed to prevent use of the air horns or other air-operated devices should the air system pressure drop below 85 psi. This feature is designed to prevent inadvertent actuation of the emergency/parking brakes while the vehicle is in motion.

The braking system shall be provided with a minimum of three (3) air tank reservoirs for a total air system capacity of 5,214 cu. in. 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.

Tank Capacities in Cubic Inches:

Wet	Front	Rear	Total
1,738	1,738	1,738	5,214

Spring-actuated emergency/parking brakes shall be installed on the rear axle.

A Bendix-Westinghouse SR-1 valve, in conjunction with a double check valve system, shall provide automatic emergency brake application when the air brake system pressure falls below 40 psi in order to safely bring the vehicle to a stop in case of an accidental loss of braking system air pressure.

A four-channel Wabco ABS shall be provided to improve vehicle stability and control by reducing wheel lock-up during braking. This braking system shall be fitted to both front and rear axles. All electrical connections shall be environmentally-sealed for protection against water, weather, and vibration.

The system shall constantly monitor wheel behavior during braking. Sensors on each wheel transmit wheel speed data to an electronic processor, which shall detect approaching wheel lock-up and instantly modulate (or pump) the brake pressure up to five (5) times per second to prevent wheel lock-up. Each wheel shall be individually controlled. To improve field performance, the system shall be equipped with a dual-circuit design configured in a diagonal pattern. Should a malfunction occur in one circuit, that circuit shall revert to normal braking action. A warning light at the driver`s instrument panel shall signal a malfunction.

The system shall also be configured to work in conjunction with all auxiliary engine, exhaust, or driveline brakes to prevent wheel lock-up.

To improve maintenance troubleshooting, 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.

Brake System Fittings

All air brake system hoses on the chassis shall be connected by use of compression fittings. Includes air lines in the chassis cab and accessories (if equipped).

Park Brake Release

One (1) Bendix-Westinghouse PP-5 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 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."

Electronic Stability Control

The apparatus shall be equipped with a G4 4S4M Electronic Stability Control (ESC) system that combines the functions of Roll Stability Control (RSC) with the added capability of yaw - or rotational – sensing.

RSC focuses on the vehicle's center of gravity and the lateral acceleration limit or rollover threshold. When critical lateral acceleration thresholds are exceeded, RSC intervenes to regulate the vehicle's deceleration functions. The added feature of ESC is to automatically intervene to reduce the risk of the vehicle rotating while in a curve or taking evasive action, prevents drift out through selective braking, and controlling and reducing vehicle speed when lateral acceleration limits are about to be exceeded.

Intervention by the system occurs in three forms - engine, retarder and brake control. The ESC system uses several sensors to monitor the vehicle. These include a steering wheel angle sensor, lateral accelerometer, and yaw position sensor. ESC constantly monitors driving conditions and intervenes if critical lateral acceleration is detected or if the vehicle begins to spin due to low friction surfaces. The system provides control of engine and retarder torque as well as automatically controlling individual wheels to counteract both over steer and under steer.

To further improve vehicle drive characteristics, the unit shall be fitted with Automatic Traction Control (ATC). This system shall control drive wheel slip during acceleration from a resting point. An extra solenoid valve shall be added to the ABS system. The system shall control the engine and brakes to improve acceleration slip resistance. The system shall have a dash mounted light that shall come on when ATC is controlling drive wheel slip.

3 year/300,000 miles parts and labor warranties for ESC, RSC, and ATC shall be provided as standard by Meritor Automotive.

AIR SYSTEM

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.

Air Lines

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

Air Inlet

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

Isolated Air Reservoir

The air system shall have an additional 1738 cu. in. isolated reservoir. The supply side of the reservoir shall be equipped with a check valve and an 85 psi pressure protection valve.

Specified options shall be plumbed to the isolated air tank.

Auxiliary Air Tank Plumbing

The auxiliary air tank shall be plumbed to the following optional accessories, if equipped: Chassis air horns, brake system air outlet, air reel, light tower, air primer, air operated devices and or customer/dealer installed pneumatic add-on(s).

Air Horns

Dual Hadley e-tone 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 air horns. A pressure protection valve shall be installed to prevent the air brake system from being depleted of air pressure.

ENGINES & TRANSMISSIONS

Engine/Transmission Package

Engine

The vehicle shall utilize a Cummins X12 engine as described below:

- 455 Horsepower
- Six (6) cylinder
- Variable Geometry Turbocharged
- Charge Air Cooled (CAC) 4-cycle diesel
- Cummins XPI high pressure fuel injection system
- Fuel cooler (air to liquid)
- 720 cu.in. (11.8 liter) displacement
- 455 gross BHP at 1900 RPM and a peak torque of 1700 lb.ft. at 1000 RPM with a governed RPM of 2000
- Bore and stroke shall be 5.2 x 5.67
- Engine lubrication system shall have a minimum capacity, to include filter, of 49 quarts
- Cooled Exhaust Gas Recirculation (EGR)
- Delco-Remy 39 MT-HD 12 volt starter
- 26 cubic foot per minute air compressor
- Single module after treatment system consisting of a oxidation catalyst and diesel particulate filter and selective catalyst reduction system
- Ember separator compliant with current NFPA 1901 standard
- The engine shall be compliant with 2021 EPA Emission standards

The engine air intake shall draw air through the front cab grill. The intake opening shall be located on the officer (right) side behind front cab face with a plenum that directs air to the air filter. The air cleaner shall be an 11" diameter dry type that is easily accessed for service. 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.

The engine exhaust piping shall be 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 as requested. 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 transmission oil temperature gauge with warning light and buzzer shall be installed on the cab instrument panel to warn the driver of high oil temperatures that may damage the transmission.

The transmission shall have a gross input torque rating of up to 1850 lb. ft. and a gross input power rating of up to 600 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.

A water-to-oil transmission oil cooler shall be provided to ensure proper cooling of the transmission when the vehicle is stationary (no air flow).

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.

Automatic Shift to Neutral

The transmission shall be programmed to comply with NFPA 1901 and automatically shift to neutral upon application of the parking brake.

Transmission Selector

A push-button transmission shift module, Allison model 29538373, shall be located to the 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 including oil life monitor, filter life monitor, transmission health monitor and fluid level. A transmission temperature gauge with warning light and buzzer shall be installed on the cab instrument panel.

Transmission Fluid

The transmission fluid shall be TranSynd, Shell Spirax S6ATF A295, or equivalent synthetic.

Vehicle Speed

Electronic speed limiting set at 60 MPH as required by NFPA 1901.

SECONDARY BRAKING

Jacobs Engine Brake

One (1) Jacobs 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-medium-low selector switch shall be mounted in the cab accessible to the driver.

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 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.

Transmission Programming

The transmission shall include the Allison 2nd gear Pre-Select feature. This option will direct the transmission to down shift to second gear when the throttle is released and the Jacobs engine brake is engaged. This feature is designed to increase brake life and aid vehicle braking.

EXHAUST OPTIONS

Exhaust End Modification

The end of the exhaust tail pipe shall be modified to accommodate a MagneGrip exhaust end. The exhaust end shall protrude approximately 2" outside of the body. The tailpipe will discharge straight out from the side of the body.

COOLING PACKAGE

Engine Cooling Package

Radiator

The cooling system shall include an aluminum tube-and-fin radiator with a minimum of 1,408 total square inches of frontal area to ensure adequate cooling under all operating conditions. There shall be a drain valve in the bottom tank to allow the radiator to be serviced. A sight glass shall be included for quick fluid level assessment. The radiator shall be installed at the prescribed angle in order to achieve the maximum operational effectiveness. This shall be accomplished according to established work instructions and properly calibrated angle measurement equipment.

Silicone Hoses

All radiator and heater hoses shall be silicone. Pressure compensating band clamps shall be used to eliminate hose pinching on all hoses 3/4" diameter and larger. All radiator hoses shall be routed, loomed, and secured so as to provide maximum protection from chafing, crushing, or contact with other moving parts.

Coolant

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.

Coolant Recovery

There shall be a coolant overflow recovery system provided.

Charge Air Cooler System

The system shall include a charge air cooler to ensure adequate cooling of the turbocharged air for proper engine operation and maximum performance.

Charge Air Cooler Hoses

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.

Fan/Shroud

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. The fan shall be installed with grade 8 hardware which has been treated with thread locker for additional security. 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. The fan shroud shall be constructed of fiber-reinforced high temperature plastic. The shroud shall be specifically formed with curved surfaces which improves air flow and cooling.

Transmission Cooler

The cooling system shall include a liquid-to-liquid transmission cooler capable of cooling the heat generated from the transmission. When a transmission retarder is selected, the cooler shall have an increased capacity to handle the additional heat load.

FUEL SYSTEMS

Fuel System

One (1) 50 gallon fuel tank shall be provided. The tank shall be of an all-welded, aluminized-steel construction with anti-surge baffles and shall conform to all applicable Federal Highway 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 T-bolt type 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.

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 50 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.

Fuel Re-Prime

An auxiliary 12 volt fuel pump shall be included in the fuel system. The electric pump shall permit re-priming of the fuel lines and engine. The pump may be manually operated with a switch located accessible to driver. 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 by-pass 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) inlet side of OEM fuel filter.

Fuel Line

All fuel lines shall be rubber.

ALTERNATOR

360 Amp Alternator

A Niehoff model C527 360 amp SAE (J56) rated, 320 amp at 200 degrees F at 5000 RPM NFPA 1901 rated brush-less type alternator with rectifier shall be provided. It shall be self-energized and shall have a negative voltage compensating remote solid-state voltage regulator. The alternator shall be installed in accordance with the engine manufacturer`s recommendations.

BATTERIES

Battery System

The manufacturer shall supply five (5) 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. The boxes shall hold two (2) batteries on the left side and three (3) on the right side. The batteries shall have a minimum combined rating of 5,000 (5 x 1000) cold cranking amps (CCA) @ 0 degrees Fahrenheit and 1025 (5 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, one (1) for each set of batteries. Each battery tray shall be equipped with a rubber hose to facilitate drainage. The rubber hose shall be routed to drain beneath the battery box. The batteries shall be positioned in well-ventilated areas.

One (1) positive and one (1) negative jumper stud shall be provided.

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

CHASSIS OPTIONS

Engine Fan Clutch

The engine shall be equipped with a thermostatically controlled engine cooling fan. The fan shall be belt driven and utilize a clutch to engage when the engine reaches a specified temperature.

When disengaged, the fan clutch shall allow for improved performance from optional floor heaters, reduced cab interior noise, increased acceleration and improved fuel economy.

The fan shall be equipped with a fail-safe engagement so that if the clutch fails the fan shall engage to prevent engine overheating.

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.

Hydraulic Pump System

A fixed-displacement hydraulic pump system shall be provided to operate all outrigger and aerial functions as well as the chassis power steering system. This shared hydraulic system is desired because it heats the hydraulic fluid while driving to provide smoother operation to other systems in cold climate conditions, rather than utilizing a separate pump.

The hydraulic pump system shall allow the aerial system to be activated without having to shut down the water pump or reduce engine RPM`s by a switch located on the cab within easy reach of the driver. A system "engaged" indicator light shall be provided on the activation switch. Engagement of the aerial circuit shall only be allowed with the transmission in the neutral or pump gear and the parking brake engaged.

The system's hydraulic pump shall be engine mounted and able to supply thirteen (13) gpm of hydraulic fluid at a maximum pressure of 3,000 psi. The hydraulic system shall normally operate between 1,000 and 2,500 psi. It shall have flow controls to protect hydraulic components and it shall incorporate a relief valve set at 2,800 psi to prevent over-pressurization (2950 on HP78 models).

DEF Tank

A diesel exhaust fluid (DEF) tank with a five (5) gallon capacity shall be provided.

The DEF tank shall include a heater fed by hot water directly from the engine block to prevent the DEF from becoming too cool to operate correctly per EPA requirements. The tank shall include a temperature sensor to control the heater control valve that controls the feed of hot water from the engine to the DEF tank heater.

A sender shall be provided in the DEF tank connected to a level gauge on the cab dash.

The tank shall be located left side below rear of cab.

On-Spot Tire Chains

The chassis shall be provided with On-Spot automatic tire chain system.

A lock-out/safety rocker style switch shall be provided accessible to the driver for activation of the tire chains.

CAB MODEL

Cab Long 4 door

The vehicle shall be distinguished by an all-welded aluminum and fully enclosed tilt cab. The cab shall be designed exclusively for fire/rescue service and shall be pre-engineered to ensure long life. It shall incorporate an integral welded substructure of high-strength aluminum alloy extrusions that creates an occupant compartment that is essentially a protective perimeter. The

end result is a distinctive structure that is aesthetically appealing, functionally durable, and characterized by increased personnel 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 subframe. 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 0.435" wall-thickness 6063-T6 subframe 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 subframe 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 subframe 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 subframe 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 3" x 1.5" .375 thick 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 subframe 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.

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 subframe C-channel extrusion below the line of the headlights to provide protection against frontal impact.

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 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 break 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 EXTERIOR

Exterior Design

The exterior of the cab shall be 100" wide x 139.5" 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 67.5".

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 2,765-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 Roof

The cab shall have a flat roof.

Rear Cab Wall Construction

The rear cab wall shall be constructed using formed 3/16" (.188") aluminum smooth plate interlocking in aluminum extrusions. A rear cab wall overlay constructed of 3/32" (.090") diamond plate shall be provided over the smooth plate.

Cab Doors

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 72.5" high, and the rear cab door openings shall be approximately 33.75" wide x 72.5" high. The doors shall have limit straps set to allow the doors to open approximately 85 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.

The front door windows shall provide a minimum viewing area of 518 sq. in. each. The rear door windows shall provide a minimum viewing area of 554 sq. in. each. All windows shall have 75% light transmittance automotive safety tint.

The door handles on the exterior of the cab shall be a pull type with vertical orientation. The handles shall be made with corrosion free material and have a black finish. Each exterior door handle shall have an integral keyed lock.

Recessed 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 rear cab door handles shall have a vertical orientation making them easily accessible from forward or rearward outboard seating positions. Each cab door shall have a manually operated door lock actuated from the interior of each respective door.

Cab Door Style

The cab doors shall be barrier style with exposed lower steps.

Cab Steps

The lower cab steps shall extend 3.5" past the side of the cab to provide increased surface area.

Lower Cab Step

The lower cab steps shall be four inches lower than standard. The lower cab sides and fender trim shall also be extended four inches for a clean integrated appearance. For clearance when tilting, the lower rear corners of the cab shall have a small bevel.

Door Handles

The door handles on the exterior of the cab shall be a pull type with vertical orientation. The handles shall be made with corrosion free glass reinforced nylon material and have a black finish. The handles shall have clearance for a gloved hand.

Each exterior door handle shall have an integral keyed lock.

Cab Door Locks

Each cab door shall have a manually operated door lock actuated from the interior of each respective door. Exterior of each cab door shall be provided with a keyed lock integrated with the cab door handle.

The cab shall have 1250 keyed door locks provided on the exterior entry doors to secure the apparatus.

Cab Door Panels

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

Cab Door Reflective Material

Reflective Red/Lemon Yellow material striping shall be provided approximately 12" high on the lower cab door panels. The stripes shall run from the top outer corner to the bottom inside corner of the lower door area, forming a "A" shape when viewed from the rear. The reflective material shall meet NFPA 1901 requirements.

Cab Front Door Windows

Full roll-down windows shall be provided for the front cab doors with power operated heavy duty regulators. The regulators shall have worm gear drive cable operation for positive movement and long life. Scissors or gear-and-sector drives are not acceptable. Window switches shall be located at the center dash for access by the driver or officer.

Cab Rear Door Windows

Full roll-down windows shall be provided for the rear crew doors with power operated heavy duty regulators. The regulators shall have worm gear drive cable operation for positive movement and long life. Scissors or gear-and-sector drives are not acceptable. Window switches shall be located on each door with additional switches accessible by driver.

Cab Door Map Pockets

A mechanically fastened stainless steel map pocket shall be mounted on the front cab doors, centered on the kick plates. The map pockets shall be constructed of 14 gauge (.070) stainless steel.

The dimensions of the map pocket shall be approximately 10" high x 14" wide x 3" deep.

Rear Cab Door Map Pockets

A mechanically fastened stainless steel map pocket shall be mounted on the rear cab doors, centered on the kick plates. The map pockets shall be constructed of 14 gauge (.070) stainless steel.

The dimensions of the map pockets shall be approximately 10" high x 14" wide x 3" deep.

MISC EXTERIOR CAB OPTIONS

Cab Mirrors

Two (2) Ramco model 6001FFR remote controlled aluminum mirrors shall be installed. The mirrors shall incorporate a full face main section with a convex mirror with housing model CAS750, mounted to the top. The adjustment of main sections shall be through dash mounted switches. Location: Driver side mounted on front cab door, officer side mounted on front cab corner.

Driver and officer cab mirrors to be heated. Includes all surfaces (flat and convex, as applicable).

Cab Canopy Window

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

Window dimensions shall be as follows: 26.69"W x 24.5"H

Cab Wheel Well

The cab wheel well shall be increased in size to provide additional clearance for larger tires. The fender trim shall be adjustable in and out to better accommodate various wheel / tire offsets.

Front Mud Flaps

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

Handrails

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 door openings one 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.

Handrails

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.

Receptacle Mounting Plate

A mounting plate shall be provided for the battery charger receptacle, battery charger indicator and if applicable the air inlet, etc. The plate shall be constructed of 14 gauge brushed finish stainless steel and be removable for service access to the receptacle(s) and indicator.

Logo Package

The apparatus shall have manufacturer logos provided on the cab and body as applicable.

CAB INTERIOR

Interior Design

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 subframe 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.

The rear portion of the forward engine cover shall be provided with a lift-up door to provide easy access for checking and filling engine oil, transmission fluid and power steering fluid without raising the cab (a separate access panel shall be provided for the power steering when equipped with an X12 or X15 engine).

The engine cover insulation shall consist of 1/2" closed cell elastomeric compound foam with aluminum foil faced fiberglass fabric manufactured to specifically fit the engine cover. All edges and seams shall be sealed using aluminum foil faced fiberglass tape. The insulation shall meet or exceed DOT standard FMVSS 302-1 and V-0 (UI subject 94 Test).

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 engine cover area shall be covered with molded 18 lb/cu. ft. (+/-0.5) flexible integral skinned polyurethane foam at a Durometer of 60 (+/- 5.0) per ASTM F1957-99. The cover shall be approximately .5" thick with a minimum skin thickness of 0.0625 inches. The cover shall be provided to reduce the transmission of noise and heat from the engine. The cover shall be black with a pebble grain finish for slip resistance.

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 36" of seated headroom at the "H" point shall be provided over each fenderwell.

The interior side to side dimensions shall be 93" from wall padding to wall padding and 95.5" from door to door.

The floor area in front of the front seat pedestals shall be no less than 27" side to side by up to 25" front to rear for the driver and no less than 27" side to side by up to 27" 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. The studs shall be located in the driver's door area unless specified otherwise.

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. Insulation with padded interior panels 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.

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.

The driver and officer seat risers shall be welded to the main cab floor structure. Depending on the make and model of the seats, a storage compartment with a hinged door shall be provided in the risers.

The lower front cab steps shall be a minimum of 13.5" deep x 24" wide. The lower rear cab steps shall be a minimum 19" deep x 21" wide. The first step at the front and rear cab doors shall be no more than 24.0" above the ground with standard tires in the unloaded condition per NFPA 1901 standards. The front and rear steps shall incorporate full width intermediate steps for easy access to the cab interior. The intermediate step at the front doors shall be approximately 8" deep (minimum). The intermediate step at the rear doors shall be approximately 13.75" deep (minimum). 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 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 grip handle shall be provided on the left and right side windshield post for additional handholds.

Cab Controls

Cab controls shall be located on the driver side dashboard where they are clearly visible and easily reachable. Chassis operation switches shall be installed in removable panels for ease of service. The following gauges and/or controls shall be provided:

• Master battery / ignition switch (rocker with red guard) (diesel units only)
• Engine start switch (rocker) (diesel units only)
• Master power switch (rocker) (EV only)
• Run switch (rocker) (EV only)
• Marker light/headlight control switch (rocker)
• Panel light dimmer switch (rocker)
• Self-canceling turn signal control with indicators
• Windshield wiper switch with variable speed and washer controls (if not equipped with steering wheel switch pods)
• Parking brake control with red indicator light on dash

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.

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:

- Speedometer with odometer
- Tachometer with integral hour meter
- Engine oil pressure gauge with warning light and buzzer
- Engine water temperature gauge with warning light and buzzer
- Fuel gauge with low fuel indicator light
- Voltmeter
- Air filter restriction indicator
- Transmission oil temperature gauge
- Two (2) air pressure gauges with a warning light and buzzer (front air and rear air)
- Cab ajar warning indicator

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

Electrical System

The cab and chassis system shall have designated electrical distribution areas. All electrical components shall be located such that standard operations shall not interfere with or disrupt vehicle operation. An access cover shall be provided for maintenance access to the electrical distribution area. Circuit protection shall be provided by fuses, thermal reset breakers and / or solid state controls.

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.

HVAC

Air Conditioning

An overhead air-conditioner / heater system with a 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 fourteen (14) comfort discharge louvers, eight (8) to the back area of the cab, six (6) to the front area of the cab including one (1) each side outboard in the forward overhead console. These louvers will be used for both AC and heated 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. For improved corrosion resistance the evaporator shall have a hydrophilic blue fin coating.

The control panel shall actuate the air-distribution system using electric actuators. The control panel shall allow blended airflow to both the comfort air vents and defrost vents.
Separate three-speed blower switches shall be provided to independently control air speed for the front and rear blowers.

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 : 1300 @ 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.

HVAC Control Location

Heating and air conditioning controls shall be located in the center dash area accessible from both driver's and officer's seating position.

SEATS

Cab Seats

All cab seats shall be Bostrom brand.

Seat Cover Material

All seats shall have Durawear seat cover material.

Seat Fabric Color

All seats shall be gray in color.

Seating Capacity Tag

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

Seat, Driver

One (1) H. O. Bostrom Sierra air suspension seat with high back styling shall be supplied for the driver position.

Features shall include:

- Internally tethered Air-50 suspension assembly with weight, height and ride adjustment
- Fixed lumbar support
- 5" fore and aft adjustment
- Reclining seat back

The seating position shall have a bright red retractable 3-point lap and shoulder harness, providing additional safety and security for personnel. Extensions shall be provided with the seat belts so the male end can be easily grasped and the female end easily located while sitting in a normal position.

Seat, Officer

One (1) H. O. Bostrom 400 Series fixed SCBA seat shall be supplied for the officer`s position.

Features shall include:

- Generation II styling

- 12.5" wide SCBA cavity to store leading SCBA brands
- Adjustable depth SCBA cavity
- Auto-pivot and return headrest to open for improved exit with SCBA
- Removable "Store-All" side cushions
- Built in lumbar support
- Replaceable seat, side and headrest cushions

All seat positions shall have a bright red retractable 3-point lap and shoulder harness, providing additional safety and security for personnel. Extensions shall be provided with the seat belts so the male end can be easily grasped and the female end easily located while sitting in a normal position.

Seat, Rear Facing

One (1) Bostrom 400 Series tanker 450 SCBA high back SCBA storage seat shall be provided in the rear facing position over the driver side wheel well.

Features shall include:

• Removable "Store-All" side cushions.
• Auto-pivot and return headrest to open for improved exit with SCBA.
• 12.5" wide SCBA cavity to store leading SCBA Brands.
• Built in lumbar support.
• Replaceable seat, side and headrest cushions.

All seat positions shall have a bright red retractable 3-point lap and shoulder harness, providing additional safety and security for personnel. Extensions shall be provided with the seat belts so the male end can be easily grasped and the female end easily located while sitting in a normal position.

Seat, Rear Facing

One (1) Bostrom 400 Series tanker 450 SCBA high back SCBA storage seats shall be provided in the rear facing position over the officer side wheel well.

Features shall include:

• Removable "Store-All" side cushions.
• Auto-pivot and return headrest to open for improved exit with SCBA.
• 12.5" wide SCBA cavity to store leading SCBA Brands.
• Built in lumbar support.
• Replaceable seat, side and headrest cushions.

All seat positions shall have a bright red retractable 3-point lap and shoulder harness, providing additional safety and security for personnel. Extensions shall be provided with the seat belts so

the male end can be easily grasped and the female end easily located while sitting in a normal position.

Seat, Rear Wall

Two (2) Bostrom Tanker 400CT flip up fold and hold jump seats with SCBA storage shall be installed on a seat riser. Location to be driver's side inboard, officer's side inboard.

Features shall include:
- Seat bottom constructed of high density foam with a heavy wear resistant covering.
- Automatically flip up when not in use to provide increased room in the rear of the cab.
- Fold and Hold feature for seat bottom - remains in the up or down position
- Removable "Store-All" side cushions.
- Auto-pivot and return headrest to open for improved exit with SCBA.
- 12.5" wide SCBA cavity to store leading SCBA Brands.
- Built in lumbar support.
- Replaceable seat, side and headrest cushions.

All seat positions shall have a bright red retractable 3-point lap and shoulder harness, providing additional safety and security for personnel. Extensions shall be provided with the seat belts so the male end can be easily grasped and the female end easily located while sitting in a normal position.

SCBA Bracket SmartDock

A IMMI SmartDock Gen2 SCBA storage bracket shall be provided for all SCBA seats. The SmartDock is a strap-free docking station that offers single-motion SCBA insertion and hands-free release when the firefighter stands up to exit the seat. SmartDock has undergone extensive testing to ensure that it meets or exceeds industry standards. When evaluated to the NFPA 1901 Standard for Automotive Fire Apparatus, SmartDock met requirements for retaining both the cylinder and the pack in dynamic testing.

Location: officer's seat, rear facing driver's side, inboard driver's side rear wall, inboard officer's side rear wall, rear facing officer's side.

Seat Belt Extender

ReadyReach seat belt extenders shall be provided for all seats. The extender shall include an arm that places the shoulder belt D-loop in a closer, easier to reach location.

The extenders shall be provided for the driver's seat, officer's seat, rear facing driver's side, inboard driver's side rear wall, inboard officer's side rear wall, rear facing officer's side seat.

MEDICAL CABINETS

Exterior Cab Compartment

There shall be a storage compartment provided each side at the lower rear side of the cab with exterior access. The compartment shall have a door opening of approximately 42" high x 9" wide and be constructed of 1/8" aluminum plate.

The cabinet dimensions shall be 31" high x 11" wide x 17" deep interior.

A single door shall be provided on the compartment. The door shall be constructed using 1/8" (0.125") smooth aluminum plate with a quarter turn stainless steel d-ring. Latching shall be provided by a slot in the rear opening of the door area.

The compartment door shall be securely attached 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 door frame.

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

The compartments to the rear sides of the cab are to be designed with a pass-through that extends fully from the driver side compartment to the officer side compartment. The pass-through will be constructed out of 1/8" aluminum and will be incorporated into the design of any other options along the rear wall of the cab as necessary to allow the pass-through to fully extend to the opposite side of the cab. The pass-through opening shall be a minimum of 11" high and 11" wide on both the driver and officer side of the truck.

Broom Handle Tubes

(2) Aluminum broom handle tubes shall be mounted horizontally on the back wall of the cab transverse compartment.

Rear Bench Storage

There shall be one (1) horizontal hinged door provided on the front of the riser enabling access to store equipment below the rear wall bench seat. Up to two (2) flush mounted adjustable lever latches shall be provided to hold the door in the closed position. The levers shall meet NFPA 1901 standards for forward facing equipment storage.

MISC INTERIOR CAB OPTIONS

Cab Interior Padding Color

Cab interior padding to be gray color. Includes ceiling, side and rear walls as applicable.

Sun Visors

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.

Engine Cover

The engine cover shall blend in smoothly with the interior dash and flooring of the cab. The upper left and right sides shall have a sloped transition surface running front to rear providing increased space for the driver and officer.

The engine cover and engine service access door cover shall be molded 18 lb/cu. ft. (+/-0.5) flexible integral skinned polyurethane foam at a Durometer of 60 (+/- 5.0) per ASTM F1957-99. The cover shall be approximately .5" thick with a minimum skin thickness of 0.0625 inches. The cover shall be provided to reduce the transmission of noise and heat from the engine. The cover shall be black and feature a pebble grain finish for slip resistance.

Rear Engine Cover

The rear engine cover shall be provided with a reduced profile for increased legroom on the forward-facing rear inboard seats.

Trim, Rear Engine Cover

The rear portion of the engine cover shall have an overlay of aluminum diamond plate installed to provide additional wear resistance.

Cup Holder / Storage Tray

A cup holder and tray assembly shall be provided on the cab engine cover between the driver and officer. The tray shall be approximately 14" wide x 10" long x 1.5" tall and constructed from .125" aluminum plate. The top edge of the tray sides shall have a .5" lip and the front corners of the tray shall be tapered for dash access. The two (2) cup holders shall be constructed from 3.5" diameter pipe approximately 2.5" tall and be located one each side at the rear corners of the tray. The assembly shall be painted to match the cab interior color. To be mounted during final inspection.

Cab Dash - Severe Duty

The driver side and center dash shall be constructed from cast aluminum for durability and long life.

The driver side cast aluminum dash shall enclose the instrument cluster.

The center dash area shall be designed to mount electrical components like siren heads, directional bar controllers, radios, etc. The driver and officer sides shall be angled for ergonomic access and designed for either a color display or switches. Access panels shall be provided on the top, front and officer side for easy service access.

The officer side dash shall be low profile and constructed from .125" smooth aluminum plate. A service access panel shall be provided in the top surface.

The driver, center and officer side dash shall be painted to match the cab interior.

The lower kick panels below the dash to be constructed from .125 aluminum plate painted to match the cab interior. The panels shall be removable to allow for servicing components that may be located behind the panels.

Overhead Console

An overhead console shall be provided in the front of the cab for the driver and officer. The areas in front of the driver and officer shall be removable panels that can be used for switches and other electrical items. The entire overhead console shall be hinged for service access.

The overhead console shall be constructed of aluminum smooth plate painted to match the cab interior. The console shall be installed using stainless steel fasteners.

Dash Panel Cutout

Panel, blank and housing cutout for severe duty dash upper tier. Includes: dash housing to be cutout behind panel overlay area. Color: Black.

Panel construction to be consistent with removable panels in dash.

Cab Insulation Package

The cab shall be insulated to mitigate noise and ensure maximum cooling/heating capacity. The insulation package shall include 1" Polyester foam with Mylar facing for the front wall, rear wall, side walls, and ceiling, Reflectex (or equal) inside each cab door and 1" closed cell foam insulation below the front and rear facing seat risers.

Driver's SCBA Bracket

There shall be a Zico ULLH SCBA bracket with NFPA quick-release mounted on the rear wall of the cab, driver side, outboard of the rear wall seats.

CAB ELECTRICAL OPTIONS

Headlight Bezels

Four (4) dual rectangular chrome plated bezels shall be installed on the front of the cab, located two (2) each side of the grill. One set of the bezels shall be for headlights and the other for warning lights..

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.

LED Cab Headlights

There shall be (4) Peterson LED headlights provided in the low and high beam position of the head lamp assembly. The low beam headlights shall activate with the release of the parking brake for additional vehicle conspicuity and safety.

Cab Turn Signals

A pair of TecNiq LED (Light Emitting Diode) turn signal lights with clear lens shall be installed on the front of the cab. The strip type lights shall be 1.25" high x 15" long and be mounted in a polished cast aluminum housing between the quad bezels.

Windshield Wipers

Two (2) opposed radial style windshield wipers with two (2) separate electric motors shall be provided for positive operation. 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 20", and the blade length 21". Each arm shall have a 90 degree sweep for full coverage of the windshield. The wipers shall be synchronized so as to wipe each windshield simultaneously.

Cab Dome Lights

A Weldon LED dome light assembly with 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 switch, the red light activates with light assembly mounted switch only.

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.

Horn Button Switch

A two (2) position rocker switch shall be installed in the cab accessible to the driver and properly labeled to enable operator to activate the OEM traffic horn or air horn from the steering wheel horn button.

Air Horn Lanyard

There shall be a "Y" style lanyard mounted in the center of the cab that allows the driver and officer to operate the air horns. The lanyard shall activate an electrical air switch.

Foot Switch [Qty: 2]

A heavy duty metal floor mounted foot switch shall be installed to operate the Q2B siren. It shall be located driver's side, officer's side.

Push-Button Switch

A heavy duty metal push-button switch shall be installed on the officer's side switch panel to operate the Q2B siren brake.

ATC Override

An Automatic Traction Control (ATC) override switch shall be provided. The switch shall be located within reach of the driver and allow for momentary disabling of the ATC system due to mud or snow conditions.

DPF Regeneration Override

A momentary override switch shall be provided for the Diesel Particulate Filter (DPF) regeneration. The switch will inhibit the regeneration process until the switch is reset or the engine is shut down and restarted. The switch shall be located within reach of the driver.

Hazard (Door Ajar) Light

There shall be a TecNiq model S38 red LED hazard (door ajar) light installed as specified.

The light shall be located center overhead.

Door Ajar Alarm

An audible alarm shall be provided through the multiplex display(s) in the cab wired into the door ajar or indicator.

Hourmeter

The vehicle shall be equipped with an aerial PTO hourmeter mounted in the cab to comply with NFPA1901 section 19.19.8.

12 Volt Outlet [Qty: 4]

A plug-in type receptacle for handheld spotlights, cell phones, chargers, etc. shall be installed In cab driver side on 3 x 3 post rear facing just above engine cover (or seat riser if in a Hush), driver side dash, officer side dash, officer side rear cab wall in or below seat support structure as space allows. The receptacle shall be wired battery hot.

Cab Dual USB Charger Socket [Qty: 4]

A Kussmaul model 091-264-N, dual port outlet. Includes (1) USB-C and (1) USB-A NGR charger sockets for cell phones, chargers, etc. shall be installed In cab driver side on 3 x 3 post rear facing just above engine cover, driver side dash, officer side dash. The receptacle shall be wired battery hot.

USB Dual Port 091-264-N Specifications:

Input: 10 To 30 VDC (10 To 32 VDC Absolute Min./Max.

Output:4.8 to 5.2 VDC, 4.8 Amps Max

Indicator: Device Powered: Blue LED

Antenna Base [Qty: 2]

There shall be a Tessco P/N 90942 universal antenna base mounted on the cab roof with a weatherproof connector. The antenna base shall be NMO Motorola Style (equivalent to a MATM style) with RG58U coax cable. The antenna shall be located driver side forward with coaxial cable terminating at the center of the dash board, officer side forward with coaxial cable terminating at the center of the dash board.

Riser Height Compartment Lighting [Qty: 2]

One (1) EON LED light shall be provided to illuminate the interior of the riser height compartment(s) at the lower rear side of the cab. The light shall be wired through the compartment door switch.

Cab Door Step Area Lighting

There shall be eight (8) clear TecNiq model D07 LED lights provided to illuminate the cab step well areas. Two (2) lights shall be located at each door area, one (1) above each step. The lights shall have polished stainless steel housings. The lights shall be activated by the cab door ajar circuit.

Battery Charger

A Kussmaul Chief Series Charger, 40 AMP w/ remote and onboard displays shall be installed.

A fully automatic charging system shall be installed on the apparatus. The system shall have a 120/240 volt, 50/60 hertz, 6/3 amp AC input with an output of 40 amps 12 volts DC. The battery charging system shall be connected directly to the shoreline to ensure the batteries remain fully charged while the vehicle is in the fire station or firehouse.

The system shall include a remote and onboard charging status indicator panels. Each panel shall consist of an information screen to provide a visual signal of battery charging status. The microprocessor shall be continuously powered from the battery to provide the charge status.

Battery Charger Location

The battery charger shall be located behind driver's seat.

Auto-Eject Inlet Receptacle

The inlet receptacle shall be a Kussmaul 20 amp NEMA 5-20 Super Auto-Eject #091-55-20-120 with a cover. The Super Auto-Eject receptacle shall be completely sealed and have an automatic power line disconnect.

The receptacle shall be located outside driver's door next to handrail and the cover color shall be Red.

AERIAL BODY

Aerial Body Design

The apparatus body shall include a single, pumper-sized hosebed with a minimum volume of 48 cubic feet of useable space and a minimum length (fore-aft) of 140" for the storage of hose. Split hosebeds which require making and/or breaking hose connections to deploy and/or reload the full hose load are not acceptable because the extra time required to perform these operations would be detrimental to the efficient performance of the apparatus. Hosebeds which are less than 140" in length are not acceptable because the extra number of hose folds involved to load the hose would take extra space and require extra effort. The hosebed shall be designed to permit the deployment of hose from the rearmost portion of the body while the vehicle is in motion without raising the aerial ladder from its stored position. Hosebeds which deploy hose from a position partway along the side of the body are not acceptable because of the possibility of snagging the hose or a hose coupling on the aerial ladder turntable or on a protruding portion of the body. The hosebed shall be designed to allow manual reloading of the hose from the rear, top, and side without raising the aerial ladder from its stored position. These requirements are deemed essential to the effective operation of the apparatus when pumper operations are required. **NO EXCEPTIONS.**

The body design shall have a rescue-style configuration with 26" deep lower compartments and 23/24" deep upper compartments that provide a total of 170.95 cu. ft. of storage. The cubic footage shall not include ladder tunnels or the hosebed.

The minimum water tank size to be considered acceptable shall be 500 gallons to support pumper operations.

The body design shall be modular to permit easy repair and remounting. An extruded aluminum body is required to provide a strong, lightweight, corrosion-resistant vehicle.

Body Construction

The apparatus body shall be constructed entirely of aluminum extrusions with interlocking aluminum plates. A modular aluminum body is required due to the high strength-to-weight ratio of aluminum, its corrosion resistance, its ease of repair, and its light weight for increased equipment carrying capacity.

The interlocking body framework shall be constructed from beveled 6061-T6 and 6063-T5 extrusions electrically seam welded both internally and externally at each joint using 5356 aluminum alloy welding wire.

All horizontal surfaces, running boards, rear step, and the vertical rear body surface shall be constructed from aluminum diamond plate.

Body Substructure

The body substructure shall be constructed of aluminum extrusions. Body designs that incorporate steel substructures connected to aluminum compartments are not as corrosion-resistant and are not acceptable.

Body substructure crossmember extrusions shall be at the front of the body and ahead of the rear wheel well. The extrusions shall be 3" x 3" 6061-T6 aluminum with 3/8" (0.375") wall thickness. A solid 3" x 3" "I-beam" section aluminum extrusion shall be provided the full width of the body over the rear wheel well. The crossmembers shall be designed to support the compartment framing and shall be welded to 1-3/16" x 3" (1.188" x 3") solid 6063-T5 aluminum frame sill extrusions. The frame sill extrusions shall be shaped to contour with the chassis frame rails and shall be protected from contact with the chassis frame rails by 5/16" x 2" (0.31" x 2") fiber-reinforced rubber strips to prevent wear and galvanic corrosion caused when two dissimilar metals come in contact.

Body Mounting System

The body shall be attached to the chassis frame rails with a series of 5/8" (0.625") diameter steel U-bolts. The U-Bolt system shall be used to allow easy removal of the body for major repair or disassembly. Body designs that weld the body to the aerial torque box or to the chassis frame rails are not acceptable because of the stress imposed on the vehicle during road travel and aerial operations.

Water Tank Mounting System

The water tank shall be mounted on an extruded aluminum framework. The booster tank mounting system shall utilize a floating design to reduce stress from road travel and vibration. To maintain a 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 the center of gravity of the vehicle shall not be acceptable.

The body design shall allow the booster tank to be completely removable without disturbing or dismounting the apparatus body structure. An extruded aluminum cradle covered with rubber shock pads and corner braces shall support the tank.

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 tread plate. The wheel well trim shall be constructed from 6063-T5 formed aluminum extrusion.

The fenderettes shall be bolt-on and shall be easily removable. The fenderette shall be constructed from .080" aluminum with a mirror finish. The fenderette shall be 2 1/2" (2.5") wide x 2 1/4" (2.25") tall with a 26 7/8" (26.875") radius. A "P" shaped rubber gasket shall be provided between the fenderette and wheel well body panel.

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.

Stabilizer Openings

Directly behind the rear wheel well opening on each side shall be body openings for aerial stabilizers. The openings shall be framed in aluminum extrusions and fitted with removable panels for service access to the backside of the stabilizer extension rods.

Side Aerial Access Staircase

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

Access steps shall be mounted in accordance with current NFPA requirements and shall not exceed a maximum stepping height of 18". The top surface of the step shall have a minimum of 35 sq. in. and shall have an aggressive multi-directional, slip-resistant surface. Access steps shall be able to support up to 500 lbs. Steps shall be located to provide a minimum of 8" clearance between the leading edge of the step and any obstruction.

Corner Guard

Diamond plate corner guard for the rear compartment face forward of the side facing staircase(s) constructed of (.063") aluminum treadplate. Guard shall wrap around corner.

Rear Body Design

The rear body shall be designed to provide ground ladder storage, hose deployment, and service access to aerial components. A horizontally-hinged door in the center of the rear body shall provide access to the lower turntable. An access door on each side of the service door shall provide storage for ladders and pike poles. The area under the hosebed shall provide additional storage for ground ladders. The ground ladder storage locations on the rear body shall be supplied with doors. All rear access doors shall match the rear body finish.

Fuel Fill Location

The fuel fill position shall be located at the rear of the apparatus next to the waterway inlet. The fuel tank filler neck shall be located behind a hinged door that is labeled "Diesel Fuel Only".

There shall be a brushed stainless steel scuff plate below the fuel fill opening.

Body Top

Removable embossed diamond plate around the aerial turntable shall be supplied for top service access to check the aerial hydraulic oil level, and remove the oil tank top service panel when needed.

Compartment Construction

All compartment walls and ceilings shall be constructed from 1/8" (0.125") formed aluminum 3003 H14 alloy plate. Each compartment shall be modular in design and shall not be part of the body support structure.

Compartment floors shall be constructed of 3/16" (0.187") aluminum diamond plate welded in place. Compartment floors shall be supported by either 1.5" x 3" x 1/8" (0.125") walled aluminum extrusions or .5" x 3" aluminum flatbar. The compartment seams shall be sealed using a permanent pliable silicone caulk. The walls of each compartment shall be machine-louvered for adequate ventilation. External compartment tops shall be constructed of 1/8" (0.125") embossed aluminum diamond plate. Service access shall be provided to the main body wiring harnesses.

The compartment interior walls and ceiling shall be natural finish aluminum to provide a long-lasting, maintenance-free surface.

The approximate compartment sizes and locations shall be as follows:

Left Side:
There shall be one (1) compartment (L1) behind the pump module. The compartment shall be approximately 60" wide x 31" high x 24" deep (upper) and 60" wide x 26" high x 26" deep (lower) and contain approximately 49.3 cubic feet of storage space. The door opening shall be approximately 60" wide x 61" high.

There shall be one (1) compartment (L2) over the rear wheels. The compartment shall be approximately 40.5" wide x 31" high x 24" deep and contain approximately 17.44 cubic feet of storage space. The door opening shall be approximately 40.5" wide x 31" high.

There shall be one (1) compartment (L3) over the rear wheels. The compartment shall be approximately 40.5" wide x 17" high x 21" deep (upper) and 40.5" wide x 14" high x 24" deep (lower) and contain approximately 16.24 cubic feet of storage space. The door opening shall be approximately 40.5" wide x 31" high.

There shall be one (1) compartment (L4) behind the rear stabilizer. The compartment shall be approximately 26" wide x 31" high x 24" deep (upper) and 26" wide x 26" high x 26" deep (lower) and contain approximately 21.36 cubic feet of storage space. The door opening shall be approximately 26" wide x 61" high.

Right Side:
There shall be one (1) compartment (R1) behind the pump module. The compartment shall be approximately 60" wide x 31" high x 23" deep (upper) and 60" wide x 26" high x 26" deep (lower) and contain approximately 48.23 cubic feet of storage space. The door opening shall be approximately 60" wide x 61" high.

There shall be one (1) compartment (R2) behind the rear wheels. The compartment shall be approximately 47" wide x 26" high x 26" deep and contain approximately 18.38 cubic feet of storage space. The door opening shall be approximately 47" wide x 26" high.

Hosebed Construction

A single, continuous hosebed with no chutes shall be supplied on the right-hand side of the body. The hosebed shall contain 48 cubic feet of useable space for the storage of hose. The hosebed shall measure 26" high x 23" wide x 140" long (fore-aft) to allow the use of large-diameter supply hose with a minimum number of hose folds. Shorter hosebeds shall not be acceptable as shorter hosebeds are harder to load due to the increased number of folds and dutchman.

The hosebed compartment deck shall be constructed entirely from maintenance-free, extruded aluminum slats. The slats shall have an anodized rounded ribbed top surface. The slats shall be of alternating widths -- one (1) approximately 3/4" (0.75") high x 7.5" wide and the other approximately 3/4" (0.75") high x 2.75" wide -- and shall be 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 provision for the installation of adjustable hosebed dividers.

The hosebed sides shall consist of 3/16" (0.188") 3003 H14 smooth aluminum plate welded to a perimeter frame constructed of 3" x 3" x 3/16" (3" x 3" x 0.188") heavy-walled 6063-T5 aluminum extrusions for rigidity.

Hose Bed Depth

A hose bed approximately 26" deep x 23" wide x 140" long shall be provided. The hose bed shall hold up to 800` of 5" LDH and 300-400` of 2.5" or 3" DJ hose.

Hose Bed Capacity

The hose bed shall have the capacity to store the following hose from the driver side to the officer side.

300' 2.5" DJ
800' 5" LDH

Side Body Platework

The painted aluminum smooth plate body side panels shall be flush with the supporting extrusions.

Rear Body Panels

The rear body panels shall be smooth 1/8" un-painted aluminum plate to facilitate rear body striping. The panels shall be bolt-on for a clean appearance and easier repair in the event of damage.

Rear Control Doors

The driver/officer jack and master control switch panels at the rear of the body shall be provided with access doors. The doors shall have the same finish as the rear of the body.

Rear Pike Pole/Attic Ladder Storage

A storage compartment shall be provided at the rear of the body for six (6) New York Roof Hooks and one (1) attic ladder with feet. The storage area shall be labeled for two (2) 6` poles, two (2) 8` poles, two (2) 10` poles and one (1) 10` attic ladder. The pike poles and attic ladder shall be secured by a hinged aluminum plate door that matches the rear body finish.

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.

Auxiliary Ground Pads

Two (2) auxiliary ground pads shall be provided. The pads shall be 24" x 24" x 1/2" thick aluminum plate with a 20 degree formed handle with cutout for hand hold. The pads shall be stored in brackets that are welded below the body.

Handrails

Access handrails shall be provided at all step positions, including, but not limited to, the rear tailboard. All body handrails shall be constructed of maintenance-free, corrosion-resistant extruded aluminum. Handrails shall be a minimum of 1.25" diameter 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) on each side of the aerial access stair case

Steps, Standing, and Walking Surfaces

The maximum stepping distance shall not exceed 18", with the exception of the ground-to-first step distance, which shall not exceed 24". The maximum ground-to-first step distance shall be maintained when the stabilizers are deployed by the use of 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 the current edition of NFPA 1901.

All exterior steps shall be designed with a minimum slip resistance of 0.52 when tested wet using the Brungraber Mark II tester in accordance with the manufacturer's instructions.

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" (0.188") thick anodized aluminum 6463-T6 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.

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 0.1" 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" (0.188") nylon spacers to prevent the accumulation of dirt, road salt, and other corrosive materials. The ends of each rubrail section shall be provided with a rounded corner piece. The vertical surface inside the rubrail C-channel shall be inset with a reflective material for increased side and rear visibility.

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 the current edition of NFPA 1901.

A label shall be applied to both sides of the apparatus and the rear to warn operators that the aerial is not insulated.

DOORS

Roll Up Compartment Doors

ROM brand roll up door with satin finish shall be provided on compartments as specified in the following locations: L1, L2; L3; L4, R1.

The Robinson door slats shall be double wall box frame and manufactured from anodized aluminum. The slats shall have interlocking end shoes on each slat. The slats shall have interlocking joints with a PVC/vinyl inner seal to prevent any metal to metal contact and inhibit moisture and dust penetration.

The track shall be anodized aluminum with a finishing flange incorporated to provide a finished look around the perimeter of the door without additional trim or caulking. The track shall have a replaceable side seal to prevent water and dust from entering the compartment.

The doors shall be counterbalanced for ease in operation. A full width latch bar shall be operable with one hand, even with heavy gloves. Securing method shall be a positive latch device.

A magnetic type switch integral to the door shall be supplied for door ajar indication and compartment light activation.

The door opening shall be reduced by 2" in width and approximately 8-9" in height depending on door height.

Double Compartment Door

Double compartment doors shall be constructed using a box pan configuration. The outer door pans shall beveled and shall be constructed from 3/16" (0.188") aluminum plate. The inner door pans shall be constructed from 3/32" (0.090") smooth aluminum plate and shall have nutsert fittings to attach hold-open hardware. The inner pans shall have a 90-degree bend to form an integral drip rail.

The compartment doors 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 doors 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 a with #459 latch shall be provided on the primary 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 secondary door shall have a dual stage rotary latch with a 750 lb rating to hold the door in the closed position. The latch shall be mounted at the top of the door. A stainless steel paddle style handle shall be mounted on the interior pan of the door to actuate the rotary latch. The paddle handle shall be connected to the rotary latch by a 5/32" (.156") diameter rod. Cable actuation shall be deemed un-acceptable due to the potential for cable stretch and slippage. The striker pin shall be 3/8" (.38") diameter with slotted mounting holes for adjustment.

Double door latch to have latch brackets fabricated from .125 aluminum smooth plate, installed with "PULL" tags #1032993 for left side and #1032294 for right side.

The compartment doors 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 doors with a dielectric barrier. The doors shall be attached with machine screws threaded into the doorframe.

The doors shall have a gas shock-style hold-open device. The gas shocks shall have a 30 lb rating and be mounted near the top of the door (when possible).

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

The door(s) shall be installed in the following location(s): R2

Strap for Roll-Up Door

A bungee type strap shall be provided on the roll-up doors to assist in closing the door. The strap shall be affixed to both the door and the interior so the strap stays inside the compartment when lowering. The strap shall be provided on full height and high side (upper) compartments.

Anodize Aluminum Trim

A anodize aluminum trim shall be located at the bottom edge of all body compartment openings including pump enclosure with painted edge (as applicable). The trim shall provide added protection of the painted surface of the body when equipment is removed from the compartment.

SHELVES

Adjustable Shelf [Qty: 5]

There shall be an aluminum adjustable shelf provided for a compartment as specified.

The shelf shall be constructed of 3/16" (.187") smooth aluminum plate. The shelf shall have a minimum 2" front and rear lips to accommodate optional plastic interlocking compartment tile systems and shall be capable of holding 100 lbs on compartments with tracks mounted on back wall (compartments up to approximately 12" deep) or shall be capable of holding 250 lbs with tracks mounted on forward and rearward walls.

The shelf shall be sized, width and depth, to match the size and location in the compartment.

Locations: L1 (2 fwd of partition); L2; R1 (2)

Adjustable Tracks [Qty: 3]

Tracks shall be provided in the compartment as specified for use with adjustable shelves and/or trays in non-transverse compartments. The tracks shall be vertical mounted and attached to the side and/or rear walls of the compartments.

Locations: L1, L2, R1

COMPARTMENT DIVIDERS

Partition Vertical Bolt-In

Partition, bolt-in vertical partition wall. Locate in a compartment as specified. Partition constructed out of 3/16" 3003 smooth plate.

Locations: L1 centered

TRAYS / TOOLBOARDS

Roll-Out Tray [Qty: 2]

There shall be a floor mounted roll-out tray provided in a compartment as specified.

The roll-out tray shall be constructed of 3/16" (.187") smooth aluminum plate with a sanded finish and welded corners for increased strength and rigidity. The tray shall be sized in width and depth as applicable.

For greater tray accessibility, the drawer slides shall feature one hundred percent extension. The tray shall utilize a gas spring to secure the tray in the open or closed position.

The tray shall have a total capacity of 500 lbs.

Locations: R1; R2

Pull-out Toolboard

An adjustable heavy duty roll-out aluminum tool board(s) shall be provided for compartment L4.

The tool board shall be constructed of 3/16" (.187") smooth aluminum plate with double reinforcing lips on the front and rear vertical edges to increase the tool boards rigidity. The first (inward) break shall be approximately .75" and the second (outer) break shall be approximately 1.5". The tool board shall have a sanded finish and be sized in height and depth as applicable.

The tool board shall be mounted on drawer slides at the top and bottom that will permit the board to roll out of the compartment for easier access to tools and/or equipment. The slide mechanisms shall have ball bearings for ease of extension and retraction operation and dependable service. The tool board shall be mounted at top and bottom on adjustable tracking for ease of placement.

The capacity rating shall be 500 lb. maximum at full extension. A pneumatic shock shall be utilized to secure the tool board in the open or closed position.

PUMP MODULE

Pump Module Frame

An extruded aluminum pump module shall be provided and located forward of the apparatus body. The pump module shall be constructed entirely of welded aluminum alloy extrusions and interlocking aluminum plates. The pump module framework shall consist of 1.5" x 3" x .188" wall, 1.5" x 3" x .375" wall with center web and 3" x 3" x .188" wall extrusions.

The pump module design and mounting shall be separate from the body to allow the pump module and body to move independently of each other in order to reduce stress from frame twisting and vibration.

Pump Module Mounting

The pump module shall be attached to the chassis using four (4) center bonded isolation mounts and a steel mounting frame. The isolation mounts shall be 2.75" diameter and mount to the chassis with two (2) 4" x 4" x .312" A36 steel angles.

Pump Access

A pump service access opening shall be provided at the front of the pump module.

Pump Module Running Boards

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.

Stepping Surface

Each running board 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 .125". Gripping surfaces shall be circular in design, a minimum of 1" diameter and on centers not to exceed 4". Each running board shall be bolted on to the pump module and be easily removable for replacement in the case of damage.

Runningboard Suction Tray

A running board suction hose storage tray approx. 35"W x 10"D (9" to slats) shall be provided and located in the officer side running board.

The tray shall be recessed mounted and constructed of 1/8" (.125") aluminum diamond plate (exterior) with a smooth surface interior. The bottom of the tray shall have removable aluminum slats and drain holes to allow water drainage from hose stored in the tray.

A heavy-duty black nylon strap with an stainless steel quick-release buckle shall be provided for the running board hose tray(s). The strap shall be attached to the inboard side of the tray as low as practical to allow cinching of strap for securing tray contents and shall not reduce the overall tray capacity.

Triple Crosslay Hosebed

Three (3) double-stack crosslay hosebeds shall be provided at the front area of the body. There shall be two (2) crosslays for up to 200' of 1.75" double-jacket fire hose and (1) crosslay for up to 250' 2.5" double-jacket fire hose. All three crosslays shall be preconnected to the pump discharge. The crosslay decking shall be constructed entirely of maintenance-free 3/4" x 2-3/4" hollow aluminum extrusions.

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.

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.

Flex Joint

The area between the pump modules and body shall include a rubber flex joint.

PUMP PANELS

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 horizontal hinged pump access door.

The door shall be constructed of 14 gauge brushed stainless steel. 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.

Hinged Gauge Panel

The driver side upper gauge panel(s) shall be hinged to provide access to panel mounted electrical connections.

The gauge panel(s) shall be hinged to open upward 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 gauge panel(s) shall include latches to secure the panel in the closed position and two (2) mechanical/pneumatic (as applicable with the panel size) hold-opens for the open position.

Pump Panel Tags

Color coded pump panel labels shall be supplied to be in accordance with NFPA 1901 compliance.

Air Horn Switch

A heavy duty weatherproof push-button switch shall be installed at the pump operator's panel to operate the air horns.

The switch shall be labeled "Evacuation Alert".

Location: driver side pump panel.

WATER TANK

Booster Tank

The booster tank shall be T-shaped in configuration and shall have a useable capacity of 500 gallons (U.S.). The tank sides, top, and bottom shall be constructed of 1/2" (0.50") black UV-stabilized copolymer polypropylene for high strength, corrosion resistance, and long life.

The tank shall be constructed utilizing latest thermoplastic 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 water fill 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 (3" may be provided on aerial applications with up to 1.5" tank fill only) and shall dump behind the rear wheels to permit maximum traction. The tower shall have a hinged cover and a 1/4" (0.25") thick polypropylene screen.

There shall be two (2) standard tank openings; one (1) for the tank-to-pump suction line with an anti-swirl plate, and one (1) for the 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 supported in an aluminum cradle resting on the frame on fiber-reinforced rubber strips to prevent wear and galvanic corrosion caused when two dissimilar metals come it contact. The tank shall be completely removable without disturbing or dismounting the apparatus body structure.

A lifetime manufacturer`s limited warranty shall be included.

TANK PLUMBING

Tank Fill 2 Akron Valve

One (1) 2" pump-to-tank fill line having a 2" manually operated full flow 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 fill line shall be controlled using a chrome handle with an integral tag.

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 with water flowing through it.

The valve shall be of 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, 3" Akron Valve

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.

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.

LADDER STORAGE / RACKS

Ground Ladder Storage

Two (2) ground ladder storage areas shall be provided at the rear of the apparatus. The storage areas shall be located one (1) each side of the aerial pedestal. The storage areas shall be vertical in design to allow the ladders to be stored on edge. Combined with a body or aerial mounted 14` or greater ladder, they shall provide storage for up to 115` of ground ladders in order to exceed the requirements of the current edition of NFPA 1901 for both aerial ladders and quints.

The vertical compartment under the left-hand side of the aerial ladder turntable shall be approximately 8.75" wide x 26.5" high x 205" deep and shall be accessible through a door at the rear of the apparatus. The bottom of this compartment shall be no more than 55" above the ground with the vehicle in the unloaded condition to allow easy removal of the ladders.

The vertical compartment under the right-hand side of the aerial ladder turntable shall be approximately 8.375" wide x 23.375" high x 205" deep and shall be accessible through a door at the rear of the apparatus. The bottom of this compartment shall be no more than 55" above the ground with the vehicle in the unloaded condition to allow easy removal of the ladders.

The ladders in the compartments shall be held captive top and bottom by aluminum tracks and shall slide on friction-reducing material. All ladders shall be removable individually without having to remove any other ladder.

The ladder rack shall hold: PEL3-35, PEL-28 and PRL-16.

HANDRAILS / STEPS

Slide-Out Platform

The slide-out platform shall be approximately 21" deep and shall be constructed of 1/8" aluminum treadplate. 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.

Non-slip aluminum hand rail(s) with chrome plated stanchions shall be provided as best suited for use with the platform operation.

If applicable, 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.

Rear Slide-out Platform

A slide-out platform shall be mounted under the apparatus body below the hosebed. The slide-out platform shall be approximately 36" wide x 16" deep and constructed of 1/8" aluminum tread brite. 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 the end of slot to hold the platform in the extended position. A T-Pin with push button shall hold the step in the stowed position.

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

An assist handrail shall be provided below the hosebed and shall consist of one (1) 1-1/4" OD 6063T5 anodized aluminum tube mounted between chrome stanchions. The handrail shall be machine extruded with an integral ribbed surface to assure a good grip for personnel safety.

Auxiliary Step

A step below the body shall be provided. The step shall be constructed of .188" aluminum tread brite. The step surface shall be provided with an aggressive skid-resistant surface. The step

shall be in accordance with current NFPA requirements and shall include a multi-directional aggressive gripping surface incorporated into the diamond plate. The surface shall extend vertically from the diamond plate sheet a minimum of 1/8" (0.125"). Gripping surfaces shall be circular in design, a minimum of 1" diameter and on centers not to exceed 4". The step shall be located below rear of officer side pump panel.

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.

Folding Steps [Qty: 6]

Innovative Controls dual lighted LED folding step(s) shall be located (3) officer side front compartment face, (3) driver side front compartment face. The folding step(s) shall meet current NFPA in step height and surface area.

Innovative Controls dual lighted LED folding step with LED lights integral to the step on the top to provide NFPA requirements of 2 fc (20 lx) on the stepping surface. Folding step shall also have a LED light integral to the bottom of the step to meet NFPA requirements of a stepping surface up to 18" below the step. The folding step shall sustain a minimum static load of 500 lb with a 3 to 1 safety factor. The folding step shall also meet NFPA slip resistance qualifications. Corrosion resistance shall be demonstrated by a 1000 hr salt spray test with no visible signs of deterioration of the step body or hardware.

One (1) hand rail shall be installed in compliance with current NFPA. The hand rail 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.

COVERS

Vinyl Crosslay Cover

A cover constructed of Red 18 oz. PVC vinyl coated polyester shall be installed on the crosslay. The base fabric shall be 1000 x 1300 Denier Polyester with a fabric count of 20 x 20 per square inch.

The cover shall be held in place across the top of the body by chrome snaps. The sides of the cover shall have integral flaps that extend down to cover the sides of the crosslay. The side flaps shall be secured in place to comply with the latest edition of NFPA 1901.

Cover Hose Bed-Aluminum

An aluminum cover shall be provided to protect fire hose stored in the hose bed.

The hose bed cover shall be constructed of 1/8" aluminum tread brite and shall be one (1) piece in design. The cover shall be hinged with a full-length stainless steel knuckle

hinge. For ease of use a pneumatic cylinder (gas shock) shall be used at the front of the cover. Recessed handles shall be provided at the front and rear of the cover.

The cover shall have a single water and corrosion resistant switch that will activate the red flashing door ajar light in the cab to alert the driver that the cover is open.

Rear Hose Bed Cover

A cover constructed of Red 18 oz. PVC vinyl coated polyester shall be installed at the rear apparatus hose bed. The base fabric shall be 1000 x 1300 Denier Polyester with a fabric count of 20 x 20 per square inch.

The top of the cover shall be mechanically attached to the rear hose bed cover extrusion. The lower portion of the cover shall be secured in place with heavy duty nylon straps to comply with the latest edition of NFPA 1901.

MISC BODY OPTIONS

SCBA Storage

Four (4) SCBA bottle storage compartments shall be provided. The compartments shall be 8" diameter by 25" deep and located two (2) 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.

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

SCBA Strap

Straps shall be provided in each exterior storage compartment to provide secondary means to hold each SCBA bottle in the compartment. The straps shall be constructed from 1" nylon webbing formed in a loop. The strap(s) shall be mounted to the storage compartment ceiling directly inside the door opening at each bottle location.

Hose Bed Divider

There shall be a hose bed divider provided the full fore-aft length of the hose bed.

The hose bed divider shall be constructed of 1/4" (0.25") smooth aluminum plate with an extruded aluminum base welded to the bottom. The rear end of the divider shall have a 3" radius corner to protect personnel. The divider shall be natural finish aluminum for long-lasting appearance and shall be sanded and de-burred to prevent damage to the hose.

The divider shall be adjustable from side to side in the hose bed to accommodate varying hose loads.

Divider

Long hose bed divider(s) shall be held short to allow for adjustability of the divider(s) with hose bed preconnect(s) if applicable per hose loading and option locations.

Hose Bed Divider Hand Hold

There shall be a hand hole cut-out(s) on the trailing edge of each hose bed divider. The cut-out(s) is specifically sized for use in adjusting of the hose bed divider.

Pipe Cover

An aluminum smooth plate cover shall be provided in the compartment to cover the piping running through the compartment area. The cover shall be removable for ease of access to the piping.

Location: R1.

Corner Guards

The forward body corners of the body shall have corner guards installed. The corner guards shall be constructed of (.063") aluminum treadplate.

Mud Flaps

Black mud flaps with manufacturer's logo shall be provided for the body wheel wells.

Wheel Chocks

Wheel Chocks, two (2), Ziamatic #SAC-44 folding aluminum chocks with underbody mounting brackets, installed under the compartment forward of the driver's side rear axle.

PUMPS

Fire 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 of commercial or custom truck chassis and have the capacity of 1,250 to 2,250 gallons per minute (U.S. GPM) NFPA 1901 rated performance, and shall be split-shaft driven from the truck transmission.

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" 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.

Gearbox – G Gearbox

Pump gearbox shall be of sufficient size to withstand up to 16,000 lbs. ft. of drive through torque of the engine system. The drive unit shall be designed of ample capacity for lubrication reserve and to maintain the proper operating temperature. The gearbox drive shafts shall be of heat-treated chrome nickel steel and at least 2-3/4 inches in diameter, on both the input and output drive shafts. They shall withstand the full torque of the engine. All gears, both drive and pump, shall be of highest quality electric furnace chrome nickel steel. Bores shall be ground to size and teeth integrated and hardened, to give an extremely accurate gear for long life, smooth, quiet running, and higher load carrying capability. An accurately cut spur design shall be provided to eliminate all possible end thrust. (No exceptions.) The pump ratio shall be selected by the apparatus manufacturer to give maximum performance with the engine and transmission selected. If the gearbox is equipped with a power shift, the shifting mechanism shall be a heat treated, hard anodized aluminum power cylinder, with stainless steel shaft. An in-cab control for rapid shift shall be provided that locks in road or pump. For automatic transmissions, three green warning lights shall be provided to indicate to the operator(s) when the pump has completed the shift from Road to Pump position. Two green lights to be located in the truck driving compartment and one green light on pump operators panel adjacent to the throttle control. For manual transmissions, one green warning light will be provided for the driving compartment. All lights to have appropriate identification/instruction plates.

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.

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 lock-up (4th gear lock-up).

Test Ports

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

Gearbox Cooler

A gearbox cooler shall be provided to maintain safe operating temperatures during prolonged pumping operations for pump rating 1500 GPM and over.

PUMP CERTIFICATION

Pump Rating

The fire pump shall be rated at 1500 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.

PUMP OPTIONS

Steamers Flush

The pump 6" Steamer/Intake(s) shall be "Flush" mounted with cap installed close as possible/practicable to pump panel. Actual dimension will vary due to pump module width and options selected. The Flush option could result in panel scratching.

Location: driver's side, officer's side.

Zinc Anodes

The zinc anodes help prevent damage caused by galvanic corrosion within the fire 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.

Mechanical Pump Seal

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

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

Only one mechanical seal shall be required, located on the first stage suction (inboard) side of the pump and be designed to be compatible with a one piece pump shaft (no exceptions). A continuous cooling flow of water from the pump shall be directed through the seal chamber when the pump is in operation.

Manual Master Drain

A manual master drain valve shall be installed and operated from the driver side. The master pump drain assembly shall consist of a Class 1 bronze master drain with a rubber disc seal.

The manual master drain valve shall have twelve (12) 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.

Pump Cooler

The pump shall have a 3/8" line installed from the pump discharge to the booster tank to allow a small amount of water to circulate through the pump casing in order to cool the pump during sustained periods of pump operation when water is not being discharged. The pump cooler line shall be controlled from the pump operator's panel by a Innovative Controls 1/4 turn valve with "T" handle. Each 1/4 turn handle grip shall feature built-in color-coding labels and a verbiage tag

Trident Primer

A Trident air operated priming system shall be installed. The unit shall be of all brass and stainless steel construction and designed for fire pumps of 1,250 GPM (4,600 LPM) or more. Due to corrosion exposure no aluminum or vanes shall be used in the primer design. The primer shall be three-barrel design with ¾" NPT connection to the fire pump.

The primer shall be mounted above the pump impeller so that the priming line will automatically drain back to the pump. The primer shall also automatically drain when the panel control actuator is not in operation. The inlet side of the primer shall include a brass "wye" type strainer with removable stainless steel fine mesh strainer to prevent entry of debris into the primer body.

The system shall create vacuum by using air from the chassis air brake system through a two-barrel multi-stage internal "venturi nozzles" within the primer body. The noise level during operation of the primer shall not exceed 75 Db.

Air Flow Requirements

The primer shall require a minimum of 15.6 cubic foot per minute air compressor and shall be capable of meeting drafting requirements at high idle engine speed. The air supply shall be from a chassis supplied "protected" air storage tank with a pressure protection valve. The air supply line shall have a pressure protection valve set between 70 to 80 PSIG.

Primer Control

The primer control shall have a manually operated, panel mounted "push to prime" air valve. The valve shall direct air pressure from the air brake storage tank to the primer body. To prevent freezing, no water shall flow to and from the panel control.

Warranty

The primer shall be covered by a five (5) year parts warranty.

INTAKES

Left Intake 2.5 Akron Valve

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

The valve shall be an Akron 8900 series with a polymer 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 polymer 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 rockerlug 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.

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.

Right Intake 2.5 Akron Valve

One (1) 2-1/2" gated suction inlet with a manual operated Akron valve shall be installed in the right side pump panel with the valve body behind the panel. The valve control shall be located at the intake and shall visually indicate the position of the valve at all times.

The valve shall be an Akron 8900 series with a polymer 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 polymer 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 rockerlug plug with a retainer device.

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 right side pump panel.

INTAKE OPTIONS

Intake Relief Valve

The pump shall be equipped with an Akron style 59 cast brass, variable-pressure-setting relief valve on the pump suction side. It shall be designed to operate at a maximum inlet pressure of 250 PSI. The relief valve shall be normally closed and shall be set to begin opening at 125 PSI in order to limit intake pressures in the pumping system. When the relief valve opens, the overflow water shall be directed through a plumbed outlet to discharge below the body in an area visible to the pump operator. The overflow outlet shall terminate with a male 2-1/2" NST threaded fitting to allow the overflow water to be directed away from the vehicle with a short hose (supplied by the fire department) during freezing weather or under other conditions where an accumulation of water around the apparatus might be hazardous.

DISCHARGES AND PRECONNECTS

Front Jump Line 1.5 Akron Valve

One (1) 1-1/2" preconnect outlet with a manually operated Akron valve shall be supplied to the extended front bumper. The preconnect shall consist of a 2" heavy duty hose coming from the pump discharge manifold to a 2" FNPT x 1-1/2" MNST mechanical swivel hose connection to permit the use of the hose from either side of the apparatus.

The valve shall be an Akron 8900 series with a polymer 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 polymer ball when in a throttle position with water 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.

An air blow-out valve shall be installed between the chassis air reservoir and the front jump line. The control shall be installed on the pump operator`s panel.

The discharge shall be supplied with a Class 1 automatic 3/4" drain valve assembly. The automatic drain shall have an all-brass body with stainless steel check assembly. The drain shall normally be open and automatically close when the pressure is greater than 6 psi.

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.

Front Bumper Discharge Swivel, Brass In Tray

There shall be a brass swivel provided for the front bumper discharge located in hose tray center front bumper on lower back wall.

1.5 Single Crosslay Akron Valve [Qty: 2]

One (1) single crosslay discharge shall be provided at the front area of the body. The crosslay 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 hose bed 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 8900 series with a polymer 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 polymer ball when in a throttle position with water 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.

Location: crosslay 1 & 2, crosslay 3.

Left Panel 2.5 Discharge Akron Valve

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

The valve shall be an Akron 8900 series with a polymer 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 polymer ball when in a throttle position with water 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.

Location: left side discharge 1, left side discharge 2.

Right Panel 2.5 Discharge Akron Valve

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 8900 series with a polymer 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 polymer ball when in a throttle position with water 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.

Location: right side discharge 2.

Right Panel 4 Discharge with 3 Akron Valve

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 terminating with a 4" MNST adapter. The end of the discharge adapter shall be equipped with a chrome plated rockerlug cap with a retainer.

The valve shall be an Akron 8900 series with a polymer 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 polymer steel ball when in a throttle position with water 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.

Location: right side discharge 1.

Left 2.5 Hose Bed Discharge Akron Valve

One (1) 2-1/2" preconnect outlet with a manually operated Akron 8900 series valve with Polymer ball shall be supplied to the lower left of the apparatus hose bed. The preconnect shall consist of a 2-1/2" heavy-duty hose coming from the pump discharge manifold to 2-1/2" stainless piping extended to the rear of the hosebed terminating with a 2-1/2" hose thread adapter. The extended piping shall include a smooth plate aluminum cover with drainage slots.

The valve shall be an Akron 8900 series with a polymer 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 polymer steel ball when in a throttle position with water 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.

Waterway Discharge with Akron Valve

One (1) 4" discharge outlet with a 3" manually operated Akron valve shall be connected from the pump discharge to the aerial waterway.

The valve shall be an Akron 8900 series with a polymer 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 polymer steel ball when in a throttle position with water 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.

DISCHARGE OPTIONS

IC Push/Pull Control

The apparatus pump panel shall be equipped with Innovative Controls Side Mount Valve Controls. The ergonomically designed ¼ turn push-pull T-handle shall be chrome-plated zinc with recessed labels for color-coding and verbiage. An anodized aluminum control rod and housing shall, together with a stainless spring steel locking mechanism, eliminate valve drift. Teflon impregnated bronze bushings in both ends of the rod housing shall minimize rod deflection, never need lubrication, and ensure consistent long-term operation. The control assembly shall include a decorative chrome-plated zinc panel-mounting bezel with areas for color-coding and/or FOAM and CAFS identification labels.

Discharge/Intake Bezel

Innovative Controls intake and/or discharge swing handle bezels shall be installed to the apparatus with mounting bolts. These bezel assemblies will be used to identify intake and/or discharge ports with color and verbiage. These bezels are designed and manufactured to withstand the specified apparatus service environment and shall be backed by a warranty equal to that of the exterior paint and finish. The specified assemblies feature a chrome-plated panel-mount bezel with durable UV resistant polycarbonate inserts. These UV resistant polycarbonate graphic inserts shall be sub-surface screen printed to eliminate the possibility of wear and protect the inks from fading. All insert labels shall be backed with 3M permanent adhesive (200MP), which meets UL969 and NFPA standards.

Bleeder Drain Valve [Qty: 10]

The bleeder/drain valves shall be Innovative Controls ¾" ball brass drain valves with chrome-plated lift lever handles and ergonomic grips. Each lift handle grip shall feature

built-in color-coding labels and a verbiage tag identifying each valve, also supplied by Innovative Controls. The color labels shall also include valve open and close verbiage.

PRESSURE GOVERNORS

Pump Pressure Governor

The apparatus shall be equipped with a Class 1 "TOTAL PRESSURE GOVERNOR" (TPG) Integrated pump control system. The TPG shall have a weatherproof color display. The TPG will operate as an engine/pump pressure governor/throttle system that is connected directly to the Electronic Control Module (ECM) mounted on the engine. The TPG is to operate as a pressure sensor (regulating) governor (PSG).

The TPG shall display engine RPM, oil pressure, engine temperature and voltage along with providing critical warnings. The warning levels for oil pressure, high engine temperature, low voltage and high voltage shall be independently programmable.

GAUGES

Master Gauges

Innovative Controls TC Series 4" (100MM) Master pressure gauges with dual bezel shall be provided. Includes test ports and alarm.

Each gauge shall have a glass-filled nylon case, a clear scratch-resistant lens, and a highly-polished stainless steel bezel. Pressure gauge shall read 0-400 psi. Intake gauge shall read -30-0-400.

The gauges shall be installed into decorative chrome-plated mounting bezels that incorporate valve-identifying verbiage and/or color labels.

The gauge shall be fully-filled with a synthetic mixture to dampen shock and vibration, lubricate the internal mechanisms, prevent lens condensation and ensure proper operation from –40°F to +160°F.

Each gauge shall exceed (NFPA 1901 16.12.3.7) ASME B40.100 Grade B requirements (3% 2% 3%) with an accuracy of +/- 1.5% full scale and include an internal thermal expansion bladder that allows the gauge fill to expand in high temperature environments.

The gauges shall also include a KEM-X Socket Saver diaphragm in the stem to eliminate freeze-up and contain a low temperature instrument oil that fills and protects the socket and bourdon tube.

The gauges shall display a range specified with enhanced black markings on a white dial.

Pressure Gauge – Individual [Qty: 10]

Innovative Controls TC Series 2.5" (63MM) pressure gauge(s) shall be provided. Each gauge shall have a glass-filled nylon case, a clear scratch-resistant lens, and a highly-polished stainless steel bezel. Gauges shall read 0-400 psi.

The gauges shall be installed into decorative chrome-plated mounting bezels that incorporate valve-identifying verbiage and/or color labels.

The gauge shall be fully-filled with a synthetic mixture to dampen shock and vibration, lubricate the internal mechanisms, prevent lens condensation and ensure proper operation from –40°F to +160°F.

Each gauge shall exceed (NFPA 1901 16.12.3.7) ASME B40.100 Grade B requirements (3% 2% 3%) with an accuracy of +/- 1.5% full scale and include an internal thermal expansion bladder that allows the gauge fill to expand in high temperature environments.

The gauges shall also include a KEM-X Socket Saver diaphragm in the stem to eliminate freeze-up and contain a low temperature instrument oil that fills and protects the socket and bourdon tube.

The gauges shall display a range specified with enhanced black markings on a white dial.

GAUGE IC 10 LED TANK LEVEL WATER/PS2TANK

One (1) Innovative Controls brand water tank level gauge shall be located at the pump operator`s panel to provide a high-visibility display of the water tank level. Ten (10) high-intensity light emitting diodes (LEDs) on the display module shall have a 3-dimensional lens allowing the full, 3/4, 1/2, 1/4, and refill levels to be easily distinguished at a glance within full 180 degree visibility.

The display module shall be protected from vibration and contamination with the components being encased in an encapsulated plastic housing. The long life and extreme durability of LED indicators eliminates light bulb replacement and maintenance. Color coded cover plates shall complete the assembly of the display module to the pump panel. System calibration shall be accomplished via supplied magnet. Display level can be set independently for maximum reliability.

The display shall provide a steady indication of fluid level despite sloshing inside of the tank when the vehicle is in motion due to an "anti-slosh" feature.

In addition to the pump panel mounted lights there shall be one (1) Whelen PSTank2 series LED (Light Emitting Diode) strip light installed as specified.

The system shall be controlled by an Innovative Control tank level driver module that is integral of the NFPA required pump panel mounted tank level light assembly.

The additional tank level system shall be interlocked through the parking brake assembly so as not to be on while the vehicle is in motion.

The remote strip light shall be arranged as follows:

Full Green
3/4 Blue
1/2 Amber
1/4 Red

Location of Whelen PSTank2 Strip Lights: each side of cab towards rear.

ELECTRICAL SYSTEMS

Multiplex Electrical System

Electrical System

The apparatus shall incorporate a Weldon V-MUX multiplex 12 volt electrical system. The system shall have the capability of delivering multiple signals via a CAN bus. The electrical system installed by the apparatus manufacturer shall conform to current SAE standards, the latest FMVSS standards, and the requirements of the applicable NFPA 1901standards.

The electrical system shall be pre-wired for optional computer modem accessibility to allow service personnel to easily plug in a modem to allow remote diagnostics.

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.

Any electrical junction or terminal boxes shall be weather-resistant and located away from water spray conditions.

Multiplex System

For superior system integrity, the networked multiplex system shall meet the following minimum component requirements:

• The network system must be Peer to Peer technology based on RS485 protocol. No one module shall hold the programming for other modules. One or two modules on a network referred to as Peer to Peer, while the rest of the network consists of a one master and several slaves is not considered Peer to Peer for this application.
• Modules shall be IP67 rated to handle the extreme operating environment found in the fire service industry.
• All modules shall be solid state circuitry utilizing MOS-FET technology and utilize Deutsch series input/output connectors.
• Each module that controls a device shall hold its own configuration program.
• Each module should be able to function as a standalone module. No "add- on" module will be acceptable to achieve this form of operation.
• Load shedding power management (8 levels).
• Switch input capability for chassis functions.
• Responsible for lighting device activation.
• Self-contained diagnostic indicators.
• Wire harness needed to interface electrical devices with multiplex modules.
• The grounds from each device should return to main ground trunk in each sub harness by the use of ultrasonic splices.

Wiring

All harnessing, wiring and connectors shall be manufactured to the following standards/guidelines. No exceptions.

• NFPA 1901-Standard for Automotive Fire Apparatus
• SAE J1127 and J1127
• IPC/WHMA-A-620 – Requirements and Acceptance for Cable and Wire Harness Assemblies. (Class 3 – High Performance Electronic Products)

All wiring shall be copper or copper alloys of a gauge rated to carry 125 of the maximum current for which the circuit is protected. Insulated wire and cable 8ga and smaller shall be SXL, GXL, or TXL per SAE J1128. Conductors 6ga and larger shall be SXL or SGT per SAE J1127.

All wiring shall be colored coded and imprinted with the circuit's function. Minimum height of imprinted characters shall not be less than .082" plus or minus .01". The imprinted characters shall repeat at a distance not greater than 3".

A coil of wire shall be provided behind electrical appliances to allow them to be pulled away from mounting area for inspection and service work.

Wiring Protection

The overall covering of the conductors shall be loom or braid.

Braid style wiring covers shall be constructed using a woven PVC-coated nylon multifilament braiding yarn. The yarn shall have a diameter of no less than .04" and a tensile strength of 22lbs. The yarn shall have a service temperature rating of -65 F to 194 F. The braid shall consist of 24

strands of yarn with 21 black and 3 yellow. The yellow shall be oriented the same and be next to each other.

Wiring loom shall be flame retardant black nylon. The loom shall have a service temperature of -40 F to 300 F and be secured to the wire bundle with adhesive-backed vinyl tape.

Wiring Connectors

All connectors shall be Deutsch series unless a different series of connector is needed to mate to a supplier's component. The connectors and terminals shall be assembled per the connector/terminal manufacturer's specification. Crimble/Solderless terminals shall be acceptable. Heat shrink style shall be utilized unless used within the confines of the cab.

Fast Idle System

A fast idle system shall be provided and controlled by a switch accessible by the driver. The system shall increase engine idle speed to a preset RPM for increased alternator output.

NFPA Required Testing of Electrical System

The apparatus shall be electrical tested upon 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.

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:

a. The nameplate rating of the alternator
b. The alternator rating under the conditions
c. Each specified component load
d. Individual intermittent loads

Vehicle Data Recorder

A vehicle data recorder system shall be provided to comply with the 2009 and 2016 editions of NFPA 1901. The following data shall be monitored:

- Vehicle speed MPH
- Acceleration (from speedometer) MPH/Sec.
- Deceleration (from speedometer) MPH/Sec.
- Engine speed RPM
- Engine throttle position % of full throttle
- ABS Event On/Off
- Seat occupied status Occupied Yes/No by position
- Seat belt status Buckled Yes/No by position
- Master Optical Warning Device Switch On/Off
- Time: 24 hour time
- Date: Year/Month/Day

Occupant Detection System

There shall be a visual and audible warning system installed in the cab that indicates the occupant buckle status of all cab seating positions that are designed to be occupied during vehicle movement.

The audible warning shall activate when the vehicle's park brake is released and a seat position is not in a valid state. A valid state is defined as a seat that is unoccupied and the seat belt is unbuckled, or one that has the seat belt buckled after the seat has been occupied.

The visual warning shall consist of a graphical representation of each cab seat in the multiplex display screen that will continuously indicate the validity of each seat position.

The system shall include a seat sensor and safety belt latch switch for each cab seating position, audible alarm and braided wiring harness.

Multiplex Display

The V-MUX multiplex electrical system shall include a Vista IV color display.

The display shall have the following features:

- Aspect ratio of 16:9 (Wide Screen)
- Diagonal measurement of no less than 7"
- Master warning switch
- Engine high idle switch
- Five (5) tactile switches to access secondary menus
- Eight (8) multi-function programmable tactile switches
- Specific door ajar indication
- Real time clock
- Provides access to the multiplex system diagnostics
- Video capability for optional back-up camera(s) and GPS display

The display shall be located driver's side engine cover.

Electrical Connection Protection

The vehicle electrical system shall be made more robust by the application of a corrosion inhibiting spray coating on all exposed electrical connections on the chassis and body. If equipped with an aerial device, the exposed connections on the aerial components shall also be protected.

The coating shall use nanotechnology to penetrate at the molecular level into uneven surfaces to create a protective water repellant film. The coating shall protect electrical connections against the environmental conditions apparatus are commonly exposed to.

WARNING LIGHTS

Light Bars

A pair of Whelen Mini Freedom IV Series 21.5" LED light bars shall be provided.

Each light bar shall contain two (2) corner LED modules forward facing, two (2) forward facing Long LED modules and one (1) outward facing Short LED module. No rear facing LEDs.

The white LEDs (if equipped) shall be switched off in blocking right of way mode.

The light bars shall be installed in the following location: front cab corners at 20 degree angle.

The front light bar shall be provided with the following color LED modules: Red/White with clear lenses

One (1) pair of Whelen 1.5" tall (model MKEZ7) mounts shall be provided on each front mini light bars.

Upper Rear Warning Lights

Two (2) pair Whelen model L31H Super LED beacons with Red LED and Red lenses.
Location: Each side of pump module offset to the rear, rear upper body on aerial style brackets to meet Zone C upper requirements.

Lower Warning Lights

Provide the following Whelen surface mount warning lights with chrome bezels.

M6 – Red LED, Clear lens, pair. Locations:
- Front Headlight Bezel Outboard
- Front Headlight Bezel Inboard
- Bumper Gravelshield Side Facing
- Above Cab Wheelwells Side Facing
- Rear of Body Side Facing
- Rear of Body Rear Facing

M2W – Red LED, Red Lens, pair. Locations:
- Below forward body compartments mounted in rubrail

SIRENS

Electronic Siren

A Whelen 295SLSA1 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.

Electronic Siren Control Location

The electronic siren control shall be located in the center overhead.

Mechanical Siren

A chrome plated and pedestal mounted Federal Q2B-P coaster siren shall be installed on top of the front bumper extension. An electric siren brake switch shall be located in the cab accessible to the driver.

The siren shall be located driver side front bumper.

SPEAKERS

Siren Speaker [Qty: 2]

One (1) Federal Signal model ES100 Dynamax 100 watt speaker shall be flush mounted as far forward and as low as possible on the front of the vehicle. A polished model MSFMT grille shall be provided on the outside of the speaker to prevent road debris from entering the speaker.

Speaker dimensions shall be: 5.5 in. high x 5.9 in. wide x 2.5 in. deep. Weight = 5.5 lbs.

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

The speaker shall be located driver side front bumper, officer side front bumper.

DOT LIGHTING

LED Marker Lights

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 Trucklite LED clearance light each side, rear of body to the side.

Lower Body:
• Three (3) red Trucklite LED clearance lights centered at rear, recessed in the rubrail.

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

Tail Lights

Three (3) Whelen model M6 series LED (Light Emitting Diode) lights shall be installed horizontally with individual housings each side at rear.

Light functions shall be as follows:

• One (1) model M62BTT LED red running light with red brake light in outboard position.
• One (1) model M62T LED amber turn signal in middle position.
• One (1) model M62BU LED clear back-up light in inner position

The turn signals shall have a populated arrow flash pattern.

License Plate Light

One (1) Truck-Lite model 15905 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.

License Plate Bracket

There shall be bracket fabricated from aluminum smooth plate sanded, secured to rear of the body to accommodate a license plate.

LIGHTS - COMPARTMENT, STEP & GROUND

Compartment Light Package

Two (2) TecNiq E45 LED compartment light strip shall be mounted in each body compartment greater than 4 cu. ft. Transverse compartments shall have four (4) lights, located two (2) each side of the body.

Each light bar shall include super bright white LEDs mounted to circuit boards encapsulated in an aluminum extrusion using TecSeal with TPE sealed end caps. The lights shall produce approx. 600 lumens per foot and shall be provided with a limited lifetime warranty.

Compartment lights shall be wired to a master on/off switch located in the cab.

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.

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 TecNiq model T440 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.

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.

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 TecNiq model T440 4" circular LED (Light Emitting Diode) with clear lenses mounted in a resilient shock absorbent mount for improved bulb life (a smaller light may be used if space is limited). 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.

Ladder Tunnel Light [Qty: 3]

An EON LED light shall be provided to illuminate the ladder tunnel at the opening. The light shall be wired through the door ajar circuit on the ladder tunnel door.

LIGHTS - DECK AND SCENE

Scene Lights

Two (2) FireTech model FT-GESM, Guardian Elite LED Surface Mount scene lights with chrome flanges (when required) shall be provided.
Part #: FT-GESM
Voltage Range: 9-32 V DC
Total Amperage @ 12V DC: 10.42

RAW Lumens: 20,500
Effective Lumens: 12,290

Lights shall be located (1) each side of cab, rearward of forward doors, up high and switched in cab (side facing lights switched separately).

Cab Scene Light Switching

The cab scene lights shall be wired to activate through the appropriate side cab door ajar switch. This application allows the cab scene lights to be used as additional illumination of the ground area for personnel entering or exiting the vehicle. The switching for this application is in addition to the standard cab scene light switching.

Crosslay Light

An Optronics round LED light model TLL44 shall be installed at the rear area of the crosslay to provide crosslay lighting per current NFPA 1901. The light shall provide 720 lm effective output. The light shall have a black powder coated, die cast aluminum housing and stainless steel hardware with a weatherproof rating of IP69K.

The crosslay light shall be switched with the work light switch in the cab.

Hose Bed Light

An Optronics round LED light model TLL44 shall be installed at the front area of the hose bed to provide hose bed lighting per current NFPA 1901. The light shall provide 720 lm effective output. The light shall have a black powder coated, die cast aluminum housing and stainless steel hardware with a weatherproof rating of IP69K.

The hose bed light shall be switched with the work light switch in the cab.

Scene Lights

Two (2) FireTech model FT-GSMJR, Guardian Junior LED Surface Mount scene lights with chrome flanges (when required) shall be provided.

Each light shall produce 5K lm.

Lights shall be located up high on rear access door and switched in cab (side facing lights switched separately).

Deck/Scene Light Wired to Back-Up Lights

The rear deck or 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.

LIGHTS - NON-WARNING

Engine Compartment Light

There shall be lighting provided to illuminate the engine compartment area in compliance with NFPA 1901. The light shall be an Optronics ILL22 Series LED that has a polycarbonate lens, sealed / waterproof housing and integral switch. The light wiring circuit shall activate when the cab is tilted and master power is switched on.

Pump Compartment LED Light

An LED light shall be provided in the pump compartment area for NFPA compliance. The light shall be wired to operate with the work light switch in the cab.

LED Pump Panel Light Package

Three (3) TecNiq model E10 LED 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.

CAMERAS / INTERCOM

Camera Back-Up

There shall be a Voyager camera model number VCCS150B provided mounted on the rear of the apparatus. The camera shall feature a wide angle lens, IR LED assisted illumination for enhanced low-light performance, non-corrosive mounting bracket, and stainless steel hardware. The camera shall be interlocked with the chassis transmission. When the apparatus is placed in reverse the camera shall automatically be activated and when the transmission is placed in any other gear the screen shall return to the previously displayed screen.

The camera shall having the following specifications:

- NTSC/PAL Video output signal format
- 150° Viewing angle
- Housing: Aluminum
- Waterproof: IPX7
- Built-in microphone
- Dimensions: 2.7" W x 1.7" H x 2.5" D

The camera shall be located at the rear of the truck, up as high as possible. Optimize mounting position using space not allocated by other equipment/options unless otherwise specified.

Camera Shield

A diamond plate protective shield shall be provided for the top and sides of a camera. The shield shall be designed not to impede in the operational envelope of the camera.

Camera, Officer Side

There shall be a Voyager camera model number VCMS36RCM provided mounted on the officer`s side front cab corner. The camera shall feature high performance color optics, a wide angle lens and IR LED assisted illumination for enhanced low-light performance. The camera shall be interlocked with the right turn signal. When the apparatus` right turn signal is activated the officer`s side camera shall automatically be activated and when the turn signal is canceled shall return to the previously displayed screen.

The camera shall having the following specifications:

- Waterproof (IPX7 rated)
- NTSC Video Output Signal Format
- Sensitivity: 0 Lux
- 102° Horizontal viewing angle
- Dimensions: 1.68" W x 2.19" H x 3.31"D

Camera, Driver Side

There shall be a Voyager camera model number VCMS36RCM provided mounted on the driver`s side front cab corner. The camera shall feature high performance color optics, a wide angle lens and IR LED assisted illumination for enhanced low-light performance. The camera shall be interlocked with the left turn signal. When the apparatus` left turn signal is activated the driver`s side camera shall automatically be activated and when the turn signal is canceled shall return to the previously displayed screen.

The camera shall having the following specifications:

- Waterproof (IPX7 rated)
- NTSC Video Output Signal Format
- Sensitivity: 0 Lux
- 102° Horizontal viewing angle
- Dimensions: 1.68" W x 2.19" H x 3.31"D

Intercom 6 Cab, 1 Pump Panel

A FireCom intercom package shall be installed within the cab interior. One (1) model 5100D digital intercom with touch pad adjustable volume with advanced digital noise reduction circuitry. The intercom uses a durable membrane switch plate to control volume and change radios.
This intercom provides hearing loss protection that can occur from exposure to high noise levels.

The system contains:

- One (1) FireCom model 5100D single radio monitor shall be provided in the cab (two (2) year limited warranty).
- Six (6) FireCom model HM-10 plug in modules shall be provided at each seated position.
- One (1) FireCom model PP-20 plug in module shall be provided at the pump panel.
- Six (6) NFPA compliant headset hooks, FireCom part number 108-0678-00 shall be provided at each seated position.
- Three (3) UH51 and four (4) UH54 headsets

A stainless steel flip-up cover shall be provided at the driver side pump panel to protect the pump panel jack.

Two-Way Intercom

A Fire Research ACT two-way intercom system shall be installed to provide communications between the turntable control station and the aerial tip. The intercom system shall include two (2) speakers and two (2) control modules; one (1) with a push-to-talk button at the turntable control station and one (1) hands free at the aerial tip.

The control modules shall have push-button volume control and a LED volume display. The hands free module shall constantly transmit to the other module unless the push-to-talk button is pressed.

The intercom shall have active noise cancellation and be designed for exterior use.

MISC ELECTRICAL

Back-Up Alarm

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

12 Volt DC Power Distribution Module

A Blue Sea model 5032 12 place, split bus fuse block with ground, 12 volt DC power distribution module shall be provided. The module shall provide two isolated groups of six circuits, and shall be wired through switched hot and battery hot, and include a battery ground.

Location: behind officer's seat.

GENERATOR

A Smart Power Model HR-6 top mount style 6200 watt hydraulic generator shall be provided. The generator shall be installed in the officer side dunnage compartment.

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. 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 190 pounds. The hydraulic pump shall be driven by a chassis transmission mounted power take off (PTO). A generator control / PTO engage switch shall be mounted on the cab instrument panel to engage the PTO and start the generator.

Ratings and Capacity

Rating:	6200 watts continuous
	7500 watts peak
Volts:	120/240 volts
Phase:	Single, 4 wire
Frequency:	60 Hz
Amperage:	46 amps @ 120 volts or 23 amps @ 240 volts
Engine speed at engagement:	Recommend below 1000 RPM
Operation range:	880 to 3120 RPM

Testing

The generator shall be tested in accordance with current NFPA 1901 standards.
Notes:
*All ratings and capacities shall be derived utilizing current NFPA 1901 test parameters.
*Extreme ambient temperatures could affect generator performance

GENERATOR TEST

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.

BREAKER BOXES

Breaker Box

An eight (8) place breaker box with up to sixteen (16) 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.

Location: L1 forward wall.

LIGHTS - AREA

Cab Brow Light

One (1) FireTech 12V LED model FT-B-72-ML-W 75" white housing brow light with integral marker lights shall be provided. The light shall be installed on the front cab brow in place of the standard DOT marker lights. the light shall feature 54 LEDs` producing 19,665 usable lumens and five (5) DOT approved marker lights. The 285W 12V light shall draw 23.75 amps.

Body Scene Lights [Qty: 2]

One (1) FireTech 12V LED double stacked flood light model FT-MB-2.15-F-W 18" long with white housing shall be provided. The light shall feature 30 LEDs` producing 11,088 usable lumens. The 150W 12V light shall draw 12.5 amps. A switch shall be provided, accessible to driver, for activation of light.

The light shall include an aluminum treadplate cover to protect the light.

Location: (1) each side over L1/R1 rearward.

RECEPTACLES

Receptacle

A 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 where it will have overcurrent protection from an external source.

Location: In cab officer side on 3 x 3 post rear facing just above engine cover (or seat riser if in a Hush).

Receptacle [Qty: 2]

A 20 amp, 110 volt 3-prong straight blade NEMA 5-20 household receptacle with a weatherproof cover plate shall be installed as specified by the department.

Location: driver side rear wheel well offset forward, officer side rear wheel well offset forward,

AERIAL MODEL

78 Aerial Ladder

Performance

A 78` telescopic aerial ladder of the open-truss design shall be installed at the rear of the vehicle with the aerial ladder pointed forward when it is in the travel position. The aerial ladder shall meet or exceed the requirements of NFPA 1901 (2016 edition), Sections 19.2 through 19.6 and Sections 19.17 through 19.25.

The aerial ladder shall consist of three (3) telescopic ladder sections capable of operating from minus (-) 8 degrees to plus (+) 76 degrees elevation at any ladder extension to give a full range of movement. The aerial ladder shall be designed to provide continuous egress for firefighters and civilians from any angle of elevation to the ground as defined in the current edition of NFPA 1901.

The aerial ladder shall have a rated vertical height of 78` measured in a vertical plane from the outermost rung of the outermost fly section to the ground with the ladder at maximum elevation and extension as defined in the current edition of NFPA 1901.

The aerial ladder shall have a rated horizontal reach of 70.2` measured in a horizontal plane from the centerline of the turntable rotation to the outermost rung of the outermost fly section with the aerial ladder extended to its maximum horizontal reach as defined in the current edition of NFPA 1901.

The aerial ladder shall utilize a single pair of stabilizers - one (1) on the left and one (1) on the right opposite each other - with a maximum horizontal stabilizer spread of 16` across the centerlines of the footpads. Aerial ladders which require two (2) sets of extending stabilizers or that have a maximum stabilizer spread greater than 16` are not acceptable because of the need to utilize the aerial ladder in confined areas. Aerial ladders that require a set of drop down jacks behind the cab are not acceptable. This type of configuration decreases compartment space and increases the overall vehicle weight, causing increased bending load on the chassis. In addition, it raises the water tank, which affects the overall center of gravity of the truck. **NO EXCEPTIONS.**

The aerial ladder shall have a rated tip capacity of 825 lbs. when the ladder is unsupported at full extension and 0 degrees elevation as defined by the current edition of NFPA 1901. This capacity may take the form of firefighters wearing personal protective gear, people being

rescued, equipment, or any combination of loads not to exceed the rated tip capacity. The rated tip capacity shall include to an allowance of 75 lbs. for equipment mounted at the tip of the ladder.

The ladder shall be able to provide full operating capacities in up to 35 mph wind conditions.

Aerial Ladder Construction

To ensure a high strength-to-weight ratio, high heat resistance, and an inherent corrosion resistance, the aerial ladder shall be constructed entirely of extruded high-strength aluminum alloy. **NO EXCEPTIONS.**

All side rails, rungs, handrails, uprights and K-braces shall be made of structural 6061-T6 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 fireground 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.19.20.1: **NO EXCEPTIONS**

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 x DL + 2.5 x RL + WL equal to/less than 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 19.21.

An independent, third-party engineering firm shall verify both the structural safety factor and the stability factor. Design verification shall include computer modeling and analysis, and extensive strain gauge testing performed by an independent registered professional engineer. Written certification from the independent, third-party engineering firm shall be made available by the manufacturer upon request from the purchaser. **NO EXCEPTIONS**

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 the current edition of NFPA 1901. **NO EXCEPTIONS.**

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 the current edition of NFPA 1901. Testing procedures shall conform to the American Welding Society Standard B1.10 Guide for non-destructive testing. Test methods include a thorough visual inspection of each weld and the use of dye penetrates where applicable.

Each ladder section shall consist of two (2) extruded aluminum side rails and a combination of aluminum rungs, tubular diagonals, verticals, 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 spaced on 14" centers and shall be designed with an integral skid-resistant surface to eliminate the need for rubber rung covers. A "D" shaped rung shall be utilized to provide a larger step surface at low angles and a more comfortable grip at elevated positions. The larger step surface is critical to distribute the load on the bottom of the firefighters` foot. Round rungs are not acceptable as they increase the stress load on the foot and are more likely to cause bruising. The minimum design load of each rung shall be 500 lbs. distributed over a 3-1/2" wide area in the center of the length of the rung as required in the current edition of NFPA 1901. **NO EXCEPTIONS.**

To provide a wide working area with an easy-to-grasp handrail, the aerial ladder shall exceed the requirements of the current edition of NFPA 1901 regarding the minimum ladder section inside width and the minimum handrail height by providing the following inside widths and handrail heights:

A fly section width of at least 25" is required to allow a 24" wide stokes basket to fit between the handrails.

Section	**Width**	**Height**
Base Section	37.5"	25.25"
Second Section	30.5"	21.59"
Fly Section	25.13"	18.43"

Ladder Extension/Retraction Mechanism

Both power extension and power retraction shall be furnished and shall meet the requirements of the current edition of NFPA 1901. Extension and retraction shall be by way of two (2) hydraulic cylinders mounted on each side of the base section of the aerial ladder. Each cylinder shall have a 3.25" bore and a 59.5" stroke.

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 5.0 to 1 and the stall safety factor shall be 2.0 to 1 based on the breaking strength of the cables. The minimum ratio of the

diameter of the block and tackle sheave to the diameter of the cable shall be 12.0 to 1 to allow smooth operation and reduce bending stresses on the cables. The cables shall be treated with Pre-Lube 6 for increased service life.

The cable sizes shall be as follows:

2nd section (4 cables - 2 extend, 2 retract)	7/16" 6 x 19 galvanized cable
Fly section (4 cables - 2 extend, 2 retract)	1/4" 7 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. Nylatron NSM slide pads shall be utilized between each section to minimize friction. Four (4) C-type interlocking load transfer stations shall be utilized at the upper portion of the base and the second 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 aerial ladder handrail of the base section to indicate extension in 10` increments. A reflective dot on the base of the second section shall provide a visual reference for the operator to estimate aerial elevation.

Aerial Finish

To reduce maintenance expense, the aerial ladder shall have a natural aluminum swirled finish. This will also allow visible inspection of all ladder weld joints without having to remove paint or body filler to reveal the weld bead. Ladders finished with paint or with any other material that covers the base metal and weld joints are not acceptable. **NO EXCEPTIONS.**

Operation Times

The aerial ladder shall complete the elevation-extension-rotation test described in the current edition of NFPA 1901 in not more than 120 seconds or less. **NO EXCEPTIONS.** This test involves raising the aerial from the bedded position to full elevation and extension and rotating it 90 degrees. This test is to begin with the stabilizers deployed.

In addition to completing the test described above, the aerial ladder shall be capable of performing the following operations in the times noted:

Time to extend ladder	maximum 35 seconds
Time to retract ladder	maximum 25 seconds

Time to raise ladder	maximum 20 seconds
Time to lower ladder	maximum 30 seconds
Time to rotate 180 degrees	maximum 55 seconds

Aerial Ladder Rated Capacities

The aerial ladder shall have a rated capacity of 825 lbs. when the ladder is unsupported at full extension and 0 degrees elevation as defined by the current edition of NFPA 1901. This rated capacity consists of a 750 lb personnel rating and a 75 lb. equipment rating. The 75 lb. capacity for the equipment is for mounted equipment at the tip. This capacity may take the form of firefighters wearing personal protective gear, people being rescued, equipment, or any combination of loads not to exceed the rated tip capacity. The rated tip capacity shall be in addition to an allowance of 75 lbs. for equipment mounted at the tip of the ladder.

A sign mounted at the base of the aerial ladder shall communicate the aerial ladder capacity ratings for the following configurations when the ladder is in the unsupported, fully extended configuration while maintaining a 2.5 to 1 safety margin. These capacities may take the form of firefighters wearing personal protective gear, people being rescued, equipment, or any combination of loads not to exceed the rated capacities. For purposes of this sign, it shall be assumed that each person weighs 250 lbs. In no case shall the actual combined weights of personnel, equipment, and other loads exceed the rated capacities. The loads for each configuration are in addition to an allowance of 75 lbs. for equipment mounted at the tip of the ladder.

Condition #1- Tip load only, no water flowing

Elevation	Capacity	Pounds
-8 to 40 degrees	3 people	750 lbs.
41 to 49 degrees	4 people	1000 lbs.
50 to 76 degrees	5 people	1250 lbs.

Condition #2- Distributed loads no water flowing (These include one person at the tip)

Elevation	Capacity	Pounds
-8 to 30 degrees	4 people	1000 lbs.
31 to 45 degrees	6 people	1500 lbs.
46 to 76 degrees	9 people	2250 lbs.

Condition #3- Ladder tip load while flowing 1000 gpm with pre-piped waterway

Elevation	Capacity	Pounds
-8 to 76 degrees	2 people	500 lbs.

Hydraulic System

The hydraulic fluid reservoir shall consist of a 52 gallon tank (preliminary and subject to change) mounted to the lower turntable assembly and plumbed to the suction side of the

hydraulic pump. The tank shall be supplied with a removable top to allow access to the tank strainer filter. There shall be ports for a return line and a tank drain on the reservoir. Connections on the bottom of the tank shall utilize flange fittings for ease of service. The reservoir fill cap shall be marked "Hydraulic Oil Only". Gated valves under the tank shall facilitate filter changes. The hydraulic fluid reservoir shall have sufficient volume and be mounted in such a manner to minimize heat build up and meet the performance requirement in the current edition of NFPA 1901.

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 19.17.3.

All hydraulic components with non-sealing moving parts, whose failure could result in the movement of the aerial, shall have a minimum burst strength of four (4) times the maximum operating pressure to which the component is subjected in order to comply with the current edition of NFPA 1901.

All hydraulic components with dynamic sealing parts, whose failure could result in the movement of the aerial, shall not begin to extrude or otherwise fail at pressures at or below two (2) times the maximum operating pressure to which the component is subjected in order to comply with the current edition of NFPA 1901.

All hydraulic hoses and fittings shall have a minimum burst strength of at least three (3) times the maximum operating pressure to which the component is subjected in order to comply with the current edition of NFPA 1901.

All hydraulic tubing shall be made of stainless steel whenever possible. It shall have a minimum burst strength of four (4) times the maximum operating pressure to which it is subjected in order to exceed the requirements of the current edition of NFPA 1901. Hydraulic systems composed primarily of hose or galvanized steel lines shall not be acceptable due to the higher maintenance requirements of the system over the life of the vehicle. **NO EXCEPTIONS**

A hydraulic oil pressure gauge shall be supplied at the aerial ladder control station as required by the current edition of NFPA 1901.

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

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

The aerial ladder 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 the hydraulic cylinders. To ensure reliable performance of

holding valves, hoses shall not be permitted between a holding valve and cylinder. **NO EXCEPTIONS.**

The aerial shall incorporate the use of stainless steel tubes inside the torque box and jack legs to minimize the possibility of hydraulic leaks.

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

Auxiliary Hydraulic Pump

The hydraulic system shall include an auxiliary 12-volt hydraulic pump powered by the chassis electrical system in case the vehicle engine or the primary hydraulic pump fails . The auxiliary pump shall allow operation at reduced speeds to store the aerial device and retract the outriggers for road transportation. Self-centering switches shall be provided at the turntable and at each stabilizer control station to operate the auxiliary system.

Forward Aerial Support

The aerial ladder support shall be constructed from 7/8" thick steel plate. Bolt-in diagonal bracing shall be installed on the support structure in an "X" pattern to restrict to side movement. This design shall allow for a pre-determined amount of flex preventing premature failure that can be found in an overly rigid structure. The support 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.

Aerial Torque Box

In order to maximize structural strength and vehicle stability while minimizing rear axle weight, a vertical cylindrical aerial torque box shall be used. Vehicles utilizing horizontal square aerial torque boxes are not acceptable because the heavy weight of these designs conflicts with the goal of utilizing a single rear axle.

The aerial torque box shall be welded from 10" x 28.5 lbs./ft. A36 grade structural steel channels with .375" thick top and bottom plates and .375" thick integral bulkheads. The pedestal shall be a 24" outside diameter cylinder with a .375" wall and shall connect the rotation bearing mounting plate to the torque box.

The aerial torque box pedestal assembly shall be bolted to the chassis frame with sixteen (16) 3/4" diameter Grade 8 bolts. It shall be utilized to mount the stabilizers and the reservoir for the aerial hydraulic system.

Stabilization System

The vehicle shall come equipped with an out-and-down stabilization system. The system shall consist of two (2) hydraulically-operated out-and-down style stabilizers welded to the torque box and mounted under the frame for a low center of gravity.

The stabilizers shall have a maximum spread of 16` across the centerlines of the footpads when fully extended. The internal stabilizer tubes shall be 8" x 10" with .5" thick top and bottom plates and .625" thick sides. They shall be made of steel with a 100,000-psi minimum yield strength and shall be extended out by hydraulic cylinders. The external stabilizer tubes shall be 9.75" x 11.75" with .375" wall thickness. The internal tubes shall slide on low friction pads.

The stabilizers shall provide the vehicle with a tip-over safety margin of 1.5 times the rated aerial ladder load in any position the aerial ladder can be placed when the vehicle is on a firm and level surface.

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 19.21.3.1. The maximum grade the apparatus can be set up on is 6.8 degrees (12 percent). On a 6.8-degree (12 percent) grade, the apparatus can be leveled within a 3.4 degree (6 percent) operating range with the apparatus cab facing uphill.

The stabilizer extension cylinders shall have a 2.5" bore and a 51.5" stroke. The stabilizer lift cylinders shall be mounted on the end of the stabilizer tube and shall have a 4" bore and a 22" stroke.

The stabilizer cylinders shall be supplied with dual pilot-operated check valves on each stabilizer cylinder to hold the cylinder either in the retracted (stowed) or the extended (working) position should a hydraulic line be severed at any point in the hydraulic system. 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.

Each stabilizer leg shall have a cover plate the full height and width of the stabilizer opening, attached to the end of the leg. This plate shall serve as a protective guard and a mounting surface for the stabilizer warning lights. The top, forward, and rear edges shall be flanged for added strength. Each stabilizer shall have one (1) red warning light mounted on the outboard face of the protective guard.

The stabilizers shall be connected to a warning light in the cab to warn the operator when the stabilizers are deployed. A floodlight shall be provided in each stabilizer body opening to illuminate the stabilizer and the ground. The light shall automatically come on with the deployment of a stabilizer.

The ground contact area for each stabilizer shall be a 12" diameter circular disc without auxiliary stabilizer pads and a 24" x 24" square plate with auxiliary stabilizer pads deployed. The ground pressure shall not exceed 75 psi when the apparatus is fully loaded and the aerial device is carrying its rated capacity in every position. This shall be accomplished with the auxiliary stabilizer pads deployed.

Stabilizer Controls

The main stabilizer control panel shall be located on the rear of the apparatus to control the operation of the stabilization system. The panel shall be labels "JACKS" and shall provide a

master on-off power switch and indicator light, two (2) yellow indicator lights - one (1) for the left jack and one (1) for the right jack - to signify when each jack is fully extended and is in firm contact with the ground, a green interlock indicator light to signify when both jacks (stabilizers) are set, and a manual transfer switch to allow the operator to manually shift the hydraulic power from the jacks (stabilizers) to the ladder once the interlock light is green.

Horizontal extension and vertical lift of the stabilizers shall be controlled by two (2) switches - one (1) for the left stabilizer and one (1) for the right stabilizer - located at the rear of the apparatus just above the brake light on each side, so that the operator may observe the stabilizers during deployment. In operation, the stabilizer on each side must be fully extended horizontally before hydraulic power is automatically shifted to the vertical lift cylinder to level the vehicle. An audible alarm with a minimum 87 dbA shall sound while the stabilizers are in motion as required by the current edition of NFPA 1901. Stabilizer deployment from the stored position to the operating position shall be completed in less than 60 seconds. **NO EXCEPTION** Two (2) switches to activate the auxiliary hydraulic pump shall also be provided - one (1) on each side below the stabilizer switch - to retract the stabilizers in case the main hydraulic pump fails. The stabilizer switch and the auxiliary hydraulic pump switch on each side shall be protected from impacts by an inverted U-shaped guard made from aluminum diamond plate.

Two (2) switches - one (1) on each stabilizer leg - shall sense when the leg is in firm contact with the ground. This condition shall be indicated on the main stabilizer control panel by a yellow indicator light for each side.

Leveling of the apparatus shall be performed manually by the operator using two (2) color-coded level indicators at the rear of the apparatus in order to ensure a visual confirmation that it is safe to operate the aerial ladder. The indicator for the front-to-rear level shall be located inside the aerial ladder turntable stairwell on the left side of the vehicle near the rear. The indicator for the side-to-side level shall be located above the rubrail on the rear of the vehicle near the rear suction inlet. **NO EXCEPTIONS**

The aerial ladder hydraulic system shall be provided with an interlock that prevents rotation of the aerial ladder until both the stabilizers are down and properly set. Additionally, the system shall not permit stabilizer movement unless the aerial ladder is seated in the forward aerial support cradle in the travel position. The interlock system shall have a manual override with access through a door at the rear of the truck.

Upper Turntable

The upper turntable assembly shall connect the aerial ladder to the turntable bearing. It shall be fabricated from .375" A-572 grade 50 steel and shall have a mounting position for the aerial elevation cylinders, the ladder connecting pins, and the upper turntable operator's position.

One (1) 34.25" diameter turntable bearing with a 3" drive gear face shall be bolted to the top of the bearing mounting plate with twenty-six (26) 3/4" diameter Grade 8 plated bolts. Gear teeth shall be stub tooth form. The rated overturning moment of the turntable bearing shall be a minimum of 238,000 ft-lbs.

The operator`s turntable platform shall be constructed of .188" aluminum treadplate with "Gator Grip" non-skid integral surface mounted on a tubular frame. The platform shall extend from the left side of the aerial control station to the right side ladder rail. The platform shall extend 23" from the pedestal control station base, with a width of approximately 18". The rear of the platform shall extend approximately 19" back from the turntable gear pedestal and shall be approximately 40" wide at the rear. The platform shall be fastened by grade 8 bolts. Two (2) tubular steel handrails, each with an anti-slip finish, shall be installed on the on the right and left sides of the turntable platform. Two (2) Fire Research brand Mansaver bars, equipped with tubular padding, shall be installed between the railings. The bars shall lift up and inward (towards the ladder) permitting easy entrance to the ladder and control console. The rails shall be a minimum 39.75" high and shall not increase the overall travel height of the vehicle.

Elevation Mechanism

Two (2) 5" diameter elevating cylinders shall be mounted on the underside of the base section of the aerial ladder. A 1.75" pin shall fasten each cylinder to the turntable and a 2" pin shall fasten each cylinder to the aerial ladder. The elevating cylinders shall be mounted utilizing spherical bearings on both ends of the cylinders. The cylinders shall function only to elevate the ladder and not as a structural member to stabilize the ladder side movement. The elevating cylinders shall be provided with pilot-operated check valves to prevent movement of the ladder in case of a loss of hydraulic pressure. The elevating cylinders shall be able to raise and lower the aerial ladder to any angle from -8 degrees to +76 degrees.

The elevation system shall be designed following the current edition of NFPA 1901. The elevation cylinders shall incorporate cushions on the upper limit of travel. The 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 powered rotation system as outlined in the current edition of NFPA 1901. This system shall provide continuous rotation under all rated conditions and shall be supplied with a brake to prevent unintentional rotation.

Rotation shall be accomplished by a high-torque hydraulic motor driven through a spring-engaged, hydraulically-released, multiple-disc brake into a planetary gear box. The gear box shall have a minimum continuous torque rating of 60,000 in. lbs. and a minimum intermittent torque rating of 120,000 in. lbs. The turntable bearing, ring gear teeth, spur gear, planetary gear box, and output shaft shall have a minimum safety factor of 2.5 to 1.

Hydraulic Swivel

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 be environmentally-sealed to prevent contamination of the hydraulic fluid. The swivel shall include a 4" passage for

waterflow. The number of hydraulic ports and electrical circuits shall be dependent on the type of aerial control system as noted below:

Control System	Hydraulic Ports	Electrical Circuits
Direct hydraulic controls	8	24
Advanced Aerial Control System	5	28
Advanced Aerial Control System - Deluxe	5	36

Aerial Ladder Control Station

An aerial ladder control station shall be supplied as outlined in the current edition of NFPA 1901. The control station shall be located on the left side of the aerial turntable. The apparatus shall be supplied with labels to warn of electrocution hazard. The control console shall provide a service access door on the front and side of the console to access hydraulic and electrical connections. The electrical panel shall be contained in a junction box with labeled wires. The control console shall be angled, labeled, and supplied with lights for night operation.

Console Cover

A diamond plate contoured hinged cover shall be supplied to protect the console from the elements. The cover shall latch in the stored position and swing away from the console so as not to interfere with sight of the aerial device.

Aerial Ladder Control Levers

The control levers shall be arranged as outlined in the current edition of NFPA 1901. The first lever from the left shall be the extension control (forward for extend and back for retract). The second lever shall be the rotation control (forward for clockwise and back for counter clockwise). The third handle shall be the elevation control (forward for down and back for up). The aerial shall employ direct hydraulic controls for precise control and dependable service with minimal electrical functions. A ring around the control levers shall be provided to prevent unintentional movement.

Rung Alignment Indicator

A light on the control console shall indicate when the ladder rungs are aligned for climbing.

Aerial Ladder Alignment Indicator

A reflective arrow mounted to the body and the turntable shall indicate when the aerial ladder is aligned with the forward aerial ladder support.

Load Indication System

A lighted elevation/safe-load indicator diagram shall be located on the lower left side of the base section to indicate safe load capacity at any angle of elevation. The safe load indicator shall be

15" x 15" in size and shall clearly communicate the aerial ladder capacity in any one of the following conditions: tipload, tipload with water flowing, and distributed load at full extension. The chart shall identify capacity using graphic characters to indicate each 250 lb. increment. The chart shall be equipped with lighting and warn of electrocution hazards from power lines and lightning.

An extension indicator shall be located on the handrails of the base section to indicate feet of extension. The control pedestal shall also come equipped with a hydraulic oil pressure gauge and lights for night operation.

Aerial Waterway

One (1) 1,000 gpm pre-piped waterway shall be supplied as outlined in the current edition of NFPA 1901. The waterway shall telescope to the end of the fly section. A waterway of 4" internal diameter shall pass 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: 4.5" OD
Mid Section: 4" OD
3rd Section: 3.5" OD

The base section shall be constructed of regular aluminum and the second and third sections of the waterway shall be constructed of hard coat anodized aluminum and shall telescopic with the aerial ladder through sealed slip joints. The slip joints shall be designed with grease Zerk fittings to facilitate lubrication.

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

The water system shall be capable of flowing 1,000 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 1,000 gpm as outlined in NFPA 1901.

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. 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.

Ladder Tip Steps

Two (2) folding steps shall be located near the ladder tip to provide a position for a firefighter using the ladder pipe/monitor as outlined in the current edition of NFPA 1901. The steps shall have a raised surface for traction and cut outs for easy manual deployment. Each step shall have a minimum load rating of 500 lbs. and shall have a minimum step area of 35 sq. in.

ISO Compliance

The manufacturer shall operate a Quality Management System meeting the requirements of ISO 9001:2000.

The International Organization for Standardization (ISO) is a recognized world leader in establishing and maintaining stringent manufacturing standards and values. The manufacturer`s certificate of compliance affirms that these principles form the basis for a quality system that unswervingly controls design, manufacture, installation, and service.

The manufacturer`s quality systems shall consist of, but not be limited to, all written quality procedures (aka QOP) and other procedures referenced within the pages of the manufacturer`s Quality Manual, as well as all Work Instructions, Workmanship Standards, and Calibration Administration that directly or indirectly impacts products or processes. In addition, all apparatus assembly processes shall be documented for traceability and reference. The manufacturer shall also engage the services of a certified third party for testing purposes where required.

If the manufacturer operates more than one manufacturing facility each facility must be ISO certified.

By virtue of its ISO compliance the manufacturer shall provide an apparatus that is built to exacting standards, meets the customer`s expectations, and satisfies the customer`s requirements.

A copy of the manufacturer`s certificate of ISO compliance for each manufacturing facility shall be provided with the bid.

AERIAL HYDRAULIC SYSTEM OPTIONS

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 operator's panel.

AERIAL CONTROLS

Aerial Control System

The aerial shall employ direct hydraulic controls for precise control and dependable service with minimal electrical functions. The control valve shall be located just below the turntable console with the levers extending up through the panel.

Short Jacking System

The stabilizers shall be capable of multi-range short jack operation. The short jacking operation will allow for rapid set-up in congested/restricted areas. When short jacking is employed the aerial device shall be capable of operating within a 200 degree envelope which includes the capacity to go 10 degrees past center both front and rear. The ability to set-up in congested areas is further enhanced in that mechanical safety pins are not required thus permitting the short side stabilizer to be deployed without having to be extended.

The system shall also have the capability to be double short jacked. This is particularly applicable for maintenance/servicing situations which may occur in extremely tight areas. This configuration shall allow the cab to be tilted without having to extend the outriggers.

The system electronics shall be configured so as to prevent rotation to the short jack side and shall utilize proximity switches located outboard of the rotation gear. The system electronics shall also be configured so as to eliminate the requirement for a momentary switch to be engaged for operation in short jack mode. This function allows for normal aerial control operation during short jack deployment.

There shall be two (2) red rotation indicator lights, one (1) left and one (1) right, prominently displayed on the aerial control console. The lights shall flash when their respective stabilizer is not fully deployed.

The system shall include a aerial cradle alignment light at the turntable control console.

MONITORS

1000 GPM Electric Monitor

The aerial ladder shall be equipped with a TFT Monsoon RC electrically controlled monitor with a powder coated silver finish. The monitor shall be equipped with an Master Stream electrically controlled automatic nozzle capable of discharging 250-1,000 gpm at 100 psi nozzle pressure. This waterflow capability shall be available at any extension, elevation, or position without any restrictions while flowing 1,000 gpm. A minimum stability factor of 1.5 to 1 shall be maintained in this configuration.

The operational range of the electric monitor and nozzle shall be 135 degrees through the vertical plane (90 degrees upwards from a line perpendicular to the aerial ladder and 45 degrees downward), and 180 degrees through the horizontal plane (90 degrees to either side of the aerial ladder center line). The monitor shall be able to move in the horizontal and vertical axis simultaneously.

The monitor relay box shall include solid state components and shall be coated to resist corrosion. The monitor shall have fully enclosed motors and gears with built-in manual override capability.

Control switches for horizontal movement, vertical movement and pattern selection shall be located at the control panel.

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 on the ladder to allow operation by a firefighter on the ladder.

WATERWAY OPTIONS

Pinned Waterway Upgrade

A remote-controlled monitor/nozzle assembly shall be attached to a ladder fly section through C-channel slide pads which shall allow the monitor/nozzle assembly to be positioned at the tip of a section for maximum master stream reach or at the tip of the next section down for unobstructed rescue capabilities. The monitor/ nozzle assembly shall be pinned at either operating location with a single stainless steel "T" handle locking ball pin. A monitor control station shall be attached to the sliding monitor/nozzle assembly and shall move with it.

The turntable monitor controls shall be connected to the sliding monitor system using an electronic multiplexing system that sends all monitor control signals over a shielded pair of wires through a spring retract electric cable reel. The collector rings in the cable reel shall be specifically designed for accurate transmission of electronic signals.

A gel-cell rechargeable battery shall be located on the sliding monitor assembly. A dedicated ground wire and 12VDC positive charging wire shall be routed from the turntable control station through the electric cable reel to the monitor battery. The charging wire shall be directly connected to the chassis 12VDC battery system through a 20 amp auto reset circuit breaker.

The moveable monitor/nozzle assembly shall be capable of flowing from 300 gpm to 1000 gpm while maintaining a constant 80-100 psi nozzle pressure for maximum stream projection.

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.

Flowminder

The aerial shall be equipped with one (1) Class 1 brand Flowminder for the aerial waterway to digitally display the actual volume of water being discharged in gallons per minute and the total volume of water that has flowed through the waterway.

The readout shall be mounted at the turntable control station.

The Flowminder shall consist of:

• Weatherproof digital flow display with super-bright digits at least 1/2" (0.5") high. The display shall read actual flow and shall switch to total flow when the totalizer button is depressed and held.
• Flow transmitter mounted in the aerial waterway pipe above the swivel. The transmitter shall consist of a weather-resistant black-anodized housing with brass wetted parts with a double paddle wheel.
• Connecting cables to connect the digital display to the flow transmitter and apparatus power.
• Machined mounting hardware to hold the transmitter in position in the discharge line.

The flow meter shall be checked and calibrated prior to delivery of the apparatus.

Waterway Pressure Gauge

Innovative Controls TC Series 2.5" (63MM) waterway inlet pressure gauge (0-400) shall be provided. Each gauge shall have a glass-filled nylon case, a clear scratch-resistant lens, and a highly-polished stainless steel bezel.

The gauges shall be installed into decorative chrome-plated mounting bezels that incorporate valve-identifying verbiage and/or color labels.

The gauge shall be fully-filled with a synthetic mixture to dampen shock and vibration, lubricate the internal mechanisms, prevent lens condensation and ensure proper operation from –40°F to +160°F.

Each gauge shall exceed (NFPA 1901 16.12.3.7) ASME B40.100 Grade B requirements (3% 2% 3%) with an accuracy of +/- 1.5% full scale and include an internal thermal expansion bladder that allows the gauge fill to expand in high temperature environments.

The gauges shall also include a KEM-X Socket Saver diaphragm in the stem to eliminate freeze-up and contain a low temperature instrument oil that fills and protects the socket and bourdon tube.

The gauges shall display a range specified with enhanced black markings on a white dial.

AERIAL WARNING LIGHTS

Outrigger Warning Lights

Weldon Model 9186 surface mounted 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.

Ladder Tip Warning Lights

Two (2) Whelen Vertex model VTX609R red Super-LED light heads with clear lenses shall be supplied and mounted one each side at the ladder tip. The lights shall include model VTXFC chrome flanges.

The lights shall be wired to activate with the aerial master power switch.

AERIAL LIGHTING

Ladder Climbing Lights

A Luma-Bar Pathfinder LED lighting system shall be provided to illuminate the climbing area inside each ladder section. The strip type lights shall be located above ladder rung level and directed toward the centerline of the ladder to reduce glare. The lights shall be mounted to a 1.25" x .5" x .125" extruded aluminum channel and wired to not be an obstruction during climbing. The lights shall be controlled with the ladder lights switch at the operators control console.

The LED lights shall be Blue.

Base Flood/Spot Light

A pair of 12V FireTech model FT-WL3500-FT-W LED flood/spot lights shall be provided on the base section of the aerial device. Includes hardwired switch at turntable console.

LED 12V Flood Light [Qty: 2]

A Whelen Micro Pioneer 12V LED flood light model MPPWCS shall be provided on a low profile pedestal mount.

The lighthead shall incorporate 12 white Super-LEDs installed in a white powder coated die-cast aluminum housing with a chrome finish polycarbonate cover. The light fixture shall measure 5" wide by 8.69" high by 3.25" deep. The 45W LED light head shall be rated at 4,100 usable Lumens that draws 3.5 amps. The light shall have a black fiberglass reinforced polycarbonate handle.

The low profile pedestal mount shall consist of a cast stainless steel pedestal base with cast stainless steel swivel mount stud, pivot, and hinge assembly.

The light head shall be provided with a weather-resistant on/off switch as well as a switch at the lower console to control the light when the aerial power circuit is activated.

The light assembly shall be mounted at the tip of the aerial as specified.

Location(s): left side tip, right side tip.

MISC AERIAL ELECTRICAL

Aerial Tip Receptacle

A 20 amp, 110 volt 3-prong straight blade NEMA 5-20 household receptacle with a weatherproof cover plate shall be installed at the tip of the aerial device and wired into an apparatus breaker box with a GFI breaker.

AERIAL EQUIPMENT

Roof Ladder Bracket

Lift out slim profile style roof ladder bracket. Locate outside base section driver side for an Alco-Lite DRL-16 roof ladder.

Axe Bracket

An axe bracket shall be provided on the aerial ladder. The bracket shall be Zico model# H-AB blade guard and PAC TRAC model# 1004 clamp for the handle. The bracket shall be designed to hold a 6 lb. axe.

Location: right side fly section.

Pike Pole Mount

There shall be an aluminum tube mounted directly on the ladder for storage of an 8` NYRH pike pole. The tube shall be located left side fly section.

Stokes Basket Brackets

Brackets shall be provided to mount a stokes basket to the aerial base section while not in use. Brackets shall hold a Junkin JSA-200 stokes. The stokes basket shall mount on the base section on the left side towards front. Stokes not included.

Lifting Eyes

A pair of lifting eyes shall be located one each side at the ladder tip. The lifting eyes shall be constructed of 6061T6 aluminum and be welded one each side to the tip of the aerial`s fly section main rail. The hole in the eye shall have chamfered edges and be designed to allow attachment of 2" webbing. The lifting eyes shall have a capacity of 250 lbs. each / 500 lbs. Load on eyes and personnel at tip not to exceed rated capacity of the ladder.

SIGN PLATES

Aerial Sign Plate

Two (2) 12" 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 Job Color as specified by the customer.

AERIAL TESTING

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.

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.

Aerial Certification

All certification shall be performed by a certification organization that is accredited for inspection and testing systems on fire apparatus in accordance with ISO/IEC 17020.

The aerial ladder shall be tested in compliance with the current editions of NFPA 1901 and NFPA 1911. All critical structural components of the aerial shall include 100% nondestructive testing (NDT) before assembly and body mounting. All NDT testing shall be performed by Level II or Level III technicians who have been certified in the test methods used in accordance with ANSI/ASNT CP-189.

Welds for structural load-supporting elements shall be performed by certified welders under the guidelines of AWS. Each aluminum ladder section shall be subjected to 100% NDT visual weld inspection followed by Liquid Penetrant NDT inspection as required to qualify suspected weld defect indications. Each steel ladder section shall be subjected to 100% Magnetic Particle NDT weld inspection to assure the structural integrity of the welds.

A 100% Magnetic Particle weld inspection 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 structural 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 1911.

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 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.

GROUND LADDERS

Alco-Lite Roof Ladder

An Alco-Lite PRL-16, 16` aluminum roof ladder shall be provided. A pair of folding 3/4" (0.75") steel roof hooks shall be attached to one end of the ladder, and a pair of steel spiked feet on the other end. The ladder shall meet or exceed the requirements of the current edition of NFPA 1931.

Alco-Lite Extension Ladder

(1)Alco-Lite PEL-28, 28` aluminum two-section extension ladder shall be provided.

Alco-Lite 3-Section Extension Ladder

One (1) Alco-Lite PEL3-35, 35` aluminum 3-section extension ladder shall be provided. The fly section shall be operated by a cable and shall automatically extend as the center section is raised. The ladder shall meet or exceed the requirements of the current edition of NFPA 1931.

Alco-Lite Attic Ladder

(1) Alco-Lite FL-10, 10` 6" long aluminum folding attic ladder with safety shoes shall be provided.

Alco-Lite Roof Ladder

(1) Alco-Lite DRL-16, 16` aluminum roof ladder shall be provided. Folding steel roof hooks and steel spikes shall be attached to each end of the ladder.

Little Giant Ladder

(1) Little Giant model Velocity 13-1A, 300# Rating shall be provided.

MISC LOOSE EQUIPMENT

2 - New York Roof Hook, 6' , All purpose head, aircraft steel shaft, chisel end, Celtex grip. Fire Hooks RH-6

3 - New York Roof Hook, 8' , All purpose head, aircraft steel shaft, chisel end, Celtex grip. Fire Hooks RH-8

2 - New York Roof Hook, 10' , All purpose head, aircraft steel shaft, chisel end, Celtex grip. Fire Hooks RH-10

1 - Adapter, discharge, 2-1/2" female rigid rockerlug NST x 2-1/2" male 3.095x6 Cincy Combo thread, CP brass. Elkhart #A327.

3 - Adapter, discharge, 45o elbow, 2-1/2" female swivel rockerlug NST x 2-1/2" male 3.095x6 Cincy Combo thread, CP brass. Elkhart #105.

2 - Adapter, intake, 2-1/2" male NST x 2-1/2" female swivel rockerlug 3.095x6 Cincy Combo thread, CP brass. Elkhart S327.

3 - Cap, 2-1/2" rockerlug 3.095x6 Cincy Combo thread, CP brass, with 16" chain. Elkhart #310.

2 - Plug, 2-1/2" rockerlug, 3.095x6 Cincy Combo thread, CP brass, with 16" chain. Elkhart #311.

1 - Adapter, discharge, 30 degree elbow, 4" FM NST rocker lug swivel x 5" Stortz rigid. TFT AH3ST-NP

1 - Adapter, aerial rear inlet, 4" FM rocker lug swivel NST x 5" Stortz rigid. TFT AA12ST-NP

2 - Intake Valve, ball type, 5" Stortz elbow inlet x 6" FM NST swivel outlet. TFT Jumbo AX series with top crank or side handwheel control, configuration determined at prebuild.

4 - Cap, 5" Stortz with cable. TFT A01ST

1 – Three (3) triangular warning reflectors with carrying case.

EXTERIOR PAINT

Paint Custom Cab

The apparatus cab shall be painted Sikkens FLNA 3225 RED. The paint process shall meet or exceed current state regulations concerning paint operations. Pollution control shall include measures to protect the atmosphere, water, and soil. Contractor shall, upon demand, provide evidence that the manufacturing facility is in compliance with State EPA rules and regulations.

The aluminum cab exterior shall have no mounted components prior to painting to assure full coverage of metal treatments and paint to the exterior surfaces. Cab doors and any hinged smooth-plate compartment doors shall be painted separately to assure proper paint coverage on cab, door jambs and door edges.

Paint process shall feature Sikkens high solid LV products and be performed in the following steps:

- Corrosion Prevention - all aluminum surfaces shall be pre-treated with the Alodine 5700 conversion coating to provide superior corrosion resistance and excellent adhesion of the base coat.
- Sikkens Sealer/Primer LV - acrylic urethane sealer/primer shall be applied to guarantee excellent gloss hold-out, chip resistance and a uniform base color.
- Sikkens High Solid LVBT650 (Base coat) - a lead-free, chromate-free high solid acrylic urethane base coat shall be applied, providing excellent coverage and durability. A minimum of two (2) coats shall be applied.
- Sikkens High Solid LVBT650 (Clear coat) - high solid LV clear coat shall be applied as the final step in order to ensure full gloss and color retention and durability. A minimum of two (2) coats shall be applied.

Any location where aluminum is penetrated after painting, for the purpose of mounting steps, hand rails, doors, lights, or other specified components shall be treated at the point of penetration with a corrosion inhibiting pre-treatment (ECK Corrosion Control). The pre-treatment shall be applied to the aluminum sheet metal or aluminum extrusions in all locations where the aluminum has been penetrated. All hardware used in mounting steps, hand rails, doors, lights, or other specified components shall be individually treated with the corrosion inhibiting pre-treatment.

After the paint process is complete, the gloss rating of the unit shall be tested with a 20 degree gloss meter. Coating thickness shall be measured with a digital MIL gauge and the orange peel with a digital wave scan device.

Paint Break with Dip to Grille

The cab shall have a two-tone paint break. The break line shall be approximately 31.5 inches below the cab roof drip rail. The paint break shall include a dip down to the corners of the cab grille.

Paint Cab Two-Tone Color

The upper section of the cab shall be painted FLNA 4006 WHITE.

The paint process of the secondary cab color shall be the same as the primary color.

Sanded Extrusions

Rear cab extrusions shall be sanded finish same height as rear cab diamond plate overlay panels.

Un-Painted Pump/Pre-Connect Module(s)

All applicable pump application modules shall have a sanded finish (not painted job color). Includes upper and lower pump modules, crosswalk module and/or speedlay/pre-connect module (as applicable). Rear mounted body/pump module shall be painted job color.

Paint Body

The apparatus body shall be painted Sikkens FLNA 3225 RED. The paint process shall meet or exceed current state regulations concerning paint operations. Pollution control shall include measures to protect the atmosphere, water, and soil. Contractor shall, upon demand, provide evidence that the manufacturing facility is in compliance with State EPA rules and regulations.

The aluminum body exterior shall have no mounted components prior to painting to assure full coverage of metal treatments and paint to the exterior surfaces of the body. Any vertically or horizontally hinged smooth-plate compartment doors shall be painted separately to assure proper paint coverage on body, door jambs and door edges.

Paint process shall feature Sikkens high solid LV products and be performed in the following steps:

- Corrosion Prevention - all aluminum surfaces shall be pre-treated with the Alodine 5700 conversion coating to provide superior corrosion resistance and excellent adhesion of the base coat.
- Sikkens Sealer/Primer LV - acrylic urethane sealer/primer shall be applied to guarantee excellent gloss hold-out, chip resistance and a uniform base color.
- Sikkens High Solid LVBT650 (Base coat) - a lead-free, chromate-free high solid acrylic urethane base coat shall be applied, providing excellent coverage and durability. A minimum of two (2) coats shall be applied.
- Sikkens High Solid LVBT650 (Clear coat) - high solid LV clear coat shall be applied as the final step in order to ensure full gloss and color retention and durability. A minimum of two (2) coats shall be applied.

Any location where aluminum is penetrated after painting, for the purpose of mounting steps, hand rails, doors, lights, or other specified components shall be treated at the point of penetration with a corrosion inhibiting pre-treatment (ECK Corrosion Control). The pre-treatment shall be applied to the aluminum sheet metal or aluminum extrusions in all locations

where the aluminum has been penetrated. All hardware used in mounting steps, hand rails, doors, lights, or other specified components shall be individually treated with the corrosion inhibiting pre-treatment.

After the paint process is complete, the gloss rating of the unit shall be tested with a 20 degree gloss meter. Coating thickness shall be measured with a digital MIL gauge and the orange peel with a digital wave scan device.

Aerial Paint

The lift cylinders, extension cylinders and upper turntable steelwork (less turntable) shall be painted to match the primary job color.

Paint Spray Out

A paint sample spray out of the cab two-tone paint color will be provided for approval prior to painting. Qty one in BOM will supply a pair of paint samples.

Undercoating

Undercoating shall consist of a heavy coating of soft seal film sprayed on the entire underside of the vehicle to repel water and road elements. Shall be applied after customer final inspection.

INTERIOR PAINT

Cab Interior Paint

The interior of the cab shall be painted multi-tone gray finish. Prior to painting, all exposed interior metal surfaces shall be pretreated using a corrosion prevention system.

LETTERING

Sign Gold Letter [Qty: 56]

Sign Gold letters up to 6" tall shall be applied.

The exact size and location of the letters shall be as specified by the customer.

Sign Gold Letters [Qty: 16]

Sign Gold letters up to 12" tall shall be applied.

The exact size, color and location of the letters shall be as specified by the customer.

Lettering Shade and/or Outline [Qty: 72]

Existing letters shall be shaded and/or outlined as specified by the customer to provide a contrast.

STRIPING

Cab and Body Stripe

A single Scotchlite stripe, up to 10 inches in width shall be installed on the cab and body . The stripe shall have a hockey style, Z or S style or any other customer specific design style.

The stripe shall be NFPA compliant and the size, color and location shall be as specified by the customer.

Scotchlite Cab Stripe

Scotchlite cab stripe shall be 3/4" in width total, 1/2" gold stripe with a 1/8" customer specified color outline on both sides and a clear polyurethane coating. Stripe shall be centrally located and shall contour with the cab, following the paint break.

Reflective Tape on Stabilizers

The two aerial ladder stabilizers which protrude beyond the side of the body shall be striped with white reflective tape. The tape shall be visible from the front and rear of the unit.

Reflective Stripe in Rubrail

The reflective stripe in the body rubrail shall be white.

Rear Body Scotchlite Striping

Printed chevron style Scotchlite striping shall be provided on the rear of the apparatus. The stripes shall consist of 6" Red/Lemon Yellow alternating stripes in an "A" pattern. The striping shall be located on the rear facing extrusions, panels, doors and inboard/outboard of the beavertails if applicable.

Designated Standing / Walking Area Indication

1" wide yellow perimeter marking consisting of individual Reflexite diamonds shall be applied to indicate the outside edge of designated standing and walking areas above 48" from the ground in compliance with 2016 NFPA 1901. Steps, ladders and areas with a railing or structure at least 12" high are excluded from this requirement.

GRAPHICS

Graphics Drawing

A graphics drawing shall be provided for the apparatus. The drawing shall include striping, lettering and logos meeting NFPA guidelines. The drawing shall be presented for review and approval by the end user prior to application of the graphics.

WARRANTY / STANDARD & EXTENDED

General 1 Year Warranty

Purchaser shall receive a General One (1) Year or 24,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0001. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

Aerial Ladder Structural Warranty

Purchaser shall receive an Aerial Ladder Structure Twenty (20) Years or 100,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0403. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

Body Structural (Aluminum) Warranty

Purchaser shall receive a Body Structure (Aluminum) Ten (10) Years or 100,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0502. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

Plumbing and Piping (Stainless Steel) Warranty

Purchaser shall receive a Plumbing and Piping (Stainless Steel) Ten (10) Years or 100,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0800. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

Meritor Rear Axle Warranty

A 5-year/unlimited miles, 5-year parts and 5-year labor rear drive single or rear drive tandem axle warranty shall be provided by Meritor Automotive.

Front Axle Warranty

A 5-year/unlimited miles, 5-year parts and 5-year labor front non-drive steer axle warranty shall be provided by Dana Corporation.

Custom Chassis Warranty

Purchaser shall receive a Custom Chassis One (1) Year or 18,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0101. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

Emissions Systems Warranty

Purchaser shall receive a Regulated Emissions Systems Five (5) Years or 100,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0140. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

Electrical Warranty

Purchaser shall receive an Electrical One (1) Year or 18,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0201. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

Cab Structural Warranty

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

Paint and Finish Warranty

Purchaser shall receive a Paint and Finish Ten (10) Years limited warranty in accordance with, and subject to, warranty certificate RFW0710. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

Frame Rail Corrosion Warranty

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

Frame Rail Warranty

Purchaser shall receive a Frame Rail Lifetime (50) Years or 250,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0305. The warranty certificate is

incorporated by reference into this proposal, and included with this proposal or available upon request

SUPPORT, DELIVERY, INSPECTIONS AND MANUALS

Approval Drawings

A general arrangement drawing depicting the vehicles appearance shall be provided. The drawing shall consist of left side, right side, front, and rear elevation views.

Vehicles requiring pump controls shall include a general arrangement view of the pump operator`s position, scaled the same as the elevation views.

Approval Drawings - Dash Panel Layout

A detailed large scale approval drawing of the dash/console panel layout shall be provided. The drawing shall be provided on an purchased unit prior to the construction process.

Pump Panel Approval Drawing

A detailed large scale approval drawing of the pump panel(s) shall be provided. The drawing shall be provided on an purchased unit prior to the construction process.

Electronic Manuals

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

- Operating Instructions, descriptions, specifications, and ratings of the cab, chassis, body, aerial (if applicable), installed components, and auxiliary systems.
- Warnings and cautions pertaining to the operation and maintenance of the fire apparatus and firefighting 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.

The electronic document 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 electronic document must be formatted in such a manner as to allow not only the printing of the entire manual, but to 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 file at both the local dealership and at the manufacturer`s location.

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

Fire Apparatus Safety Guide

Fire Apparatus Safety Guide published by FAMA, latest edition. This safety manual is intended to point out some of the basic safety situations that may be encountered during the normal operation and maintenance of a fire apparatus and to suggest possible ways of dealing with these situations. This manual is NOT a substitute for the fire apparatus operator and maintenance manuals or commercial chassis manufacturer`s operator and maintenance manuals.

Pre-Delivery Inspection

After transportation from the factory and immediately prior to delivery to the fire department, the local dealer shall provide the following service: complete inspection and operational check including chassis, cab, body, pump and aerial (as applicable), and all electrical and mechanical devices; correction of any issues and leaks; fluid level checks and top off; and complete cleaning and detailing of the apparatus.

Training

The manufacturer shall provide three (3) consecutive days of training covering vehicle maintenance and operational familiarization.

This training shall be provided by a full time, manufacturer employee trainer who specializes in aerial training.

OPTIONS

The following items shall be quoted as an option add or deduct from the Base Bid:

Engine/Transmission

Provide a deduct price to provide a Cummins L9 450 hp Engine and Allison EVS 3000 Transmission in place of the Cummins X12 455 hp Engine and Allison EVS 4000 Transmission

BIDDER COMPLIES	
YES	NO

in the Base Bid. Any other item changes applicable to the engine/transmission replacement shall be listed in the response and included in the deduct price.