

**County of Otero Purchasing**  
1101 New York Ave., Room 118  
Alamogordo, NM 88310  
(575) 434-0710  
FAX (575) 443-2914



**Sealed Bid 17-001**  
**Fire Apparatus for VFD**  
**Bid Deadline: Wednesday, June**  
**29, 2016 @ 3:00 PM**

**Procurement Agent: Ginger Herndon**

## INVITATION FOR BIDS

THE COUNTY OF OTERO IS REQUESTING COMPETITIVE SEALED BIDS FOR THE FOLLOWING GOODS OR SERVICES:

**TITLE: FIRE APPARATUS FOR VFD**  
**BID NO.: 17-001**  
**OPEN: WEDNESDAY, JUNE 29, 2016 @ 3:00 P.M. local time**

FOR ADDITIONAL INFORMATION CONTACT:

GINGER HERNDON PURCHASING AGENT  
PHONE: (575) 434-0710

THE OFFICE OF THE PURCHASING AGENT, COUNTY OF OTERO WILL RECEIVE COMPETITIVE SEALED BIDS FOR THE GOODS OR SERVICES DESCRIBED IN THIS BID AT:

**VIA MAIL**  
OTERO COUNTY PURCHASING  
1101 NEW YORK AVE. ROOM 118  
ALAMOGORDO, NM 88310

**HAND CARRIED**  
OFFICE OF THE PURCHASING AGENT  
1101 NEW YORK AVE. ROOM 118  
ALAMOGORDO, NM 88310

ANY BIDS RECEIVED AFTER BID OPENING DATE/TIME WILL BE RETURNED UNOPENED. PLEASE USE THE ENCLOSED MAIL LABEL ON THE OUTSIDE OF YOUR ENVELOPE.

***NOTE: USE OF THE MAIL SERVICE IS AT YOUR OWN RISK FOR PROPER DELIVERY.***

DUE DATE, Wednesday, June 26,2016 @ 3:00 PM

Having carefully examined the notice to bidders, general instructions to bidders, terms and conditions, supplemental terms and conditions, and project specifications, addenda(s), the site of the work, the work on the above-named project, the undersigned hereby proposes to furnish all materials, labor, equipment, tools, transportation, services, licenses, fees, permits, etc. (not including New Mexico Gross Receipt Taxes or any additive alternates) required by said documents and to complete all divisions of the work stipulated. The Board reserves the right to reject any or all bids and waive any/all formalities.

**SEE ATTACHED SPECIFICATIONS FOR COMPLIANCE**

COMPANY NAME: \_\_\_\_\_

ADDRESS: \_\_\_\_\_  
\_\_\_\_\_

PHONE# \_\_\_\_\_

FAX# \_\_\_\_\_

EMAIL: \_\_\_\_\_

PRINT NAME: \_\_\_\_\_

SIGNATURE: \_\_\_\_\_

RECEIVED ADDENDA NUMBERS: \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, WHEN ISSUED.

IN STATE PREFERENCE NO: \_\_\_\_\_

## SUPPLEMENTAL TERMS AND CONDITIONS

THESE SUPPLEMENTAL TERMS AND CONDITIONS ARE IN ADDITION TO THE GENERAL INSTRUCTIONS, TERMS AND CONDITIONS AND, IN THE EVENT OF A CONFLICT BETWEEN THE PROVISIONS OF THE GENERAL INSTRUCTIONS, TERMS AND CONDITIONS AND THESE SUPPLEMENTAL TERMS AND CONDITIONS, THE PROVISIONS OF THESE SUPPLEMENTAL TERMS AND CONDITIONS SHALL CONTROL.

**GUARANTEED PERFORMANCE:**

THE BIDDER, IF AWARDED A CONTRACT AS A RESULT OF THIS BID, GUARANTEES THAT THE MATERIALS SUPPLIED ARE CAPABLE OF THE PERFORMANCE REQUIRED IN THE SPECIFICATIONS IN THIS BID, AND AGREES TO MAKE SUCH CHANGES, ADJUSTMENTS OR REPLACEMENTS AS ARE IMMEDIATELY NECESSARY IN ORDER FOR THE MATERIALS TO MEET THE PURCHASING REQUIREMENTS AT NO COST TO THE COUNTY. IF DEFECTS OR SPECIFICATION FAILURES ARE DISCOVERED, THE PURCHASING OFFICER SHALL HAVE THE RIGHT, NOTWITHSTANDING ACCEPTANCE AND PAYMENT TO REQUIRE THE UNIT/ITEM TO BE PROPERLY FURNISHED IN ACCORDANCE WITH THE SPECIFICATIONS AND DRAWINGS AT THE COST AND EXPENSE OF THE BIDDER OR THE BIDDER'S SURETY.

**INSPECTION OF MATERIALS:**

THE COUNTY RESERVES THE RIGHT TO INSPECT MATERIALS PROVIDED BY THE BIDDER THROUGH A CONTRACT RESULTING FROM THIS BID TO DETERMINE THEIR QUALITY, FITNESS AND SUITABILITY. INSPECTION OF THESE MATERIALS MAY BE CONDUCTED WHENEVER THE COUNTY CONSIDERS NECESSARY.

**MANUFACTURER'S INFORMATION:**

ANY BID MADE IN RESPONSE TO THIS INVITATION MUST INCLUDE THE MANUFACTURER'S MAKE AND MODEL NUMBER (AS APPLICABLE) OF EACH ITEM AND LITERATURE CLEARLY DESCRIBING THE ITEM. FAILURE TO PROVIDE THIS INFORMATION MY RESULT IN REJECTION OF THE BID.

**MATERIALS AND WORKMANSHIP:**

ALL MATERIALS FURNISHED BY THE BIDDER SHALL BE FREE FROM DEFECTS AND IMPERFECTIONS. WORKMANSHIP SHALL BE IN ACCORD WITH THE BEST INDUSTRY STANDARDS AND PRACTICES. BOTH MATERIALS AND WORKMANSHIP SHALL BE SUBJECT TO THE APPROVAL OF THE COUNTY.

**BRIBES, GRATUITIES, AND KICKBACKS:**

PURSUANT TO 13-1-191 NMSA 1978, REFERENCE TO HEREBY MADE TO THE CRIMINAL LAWS OF NEW MEXICO (INCLUDING 30-14-1, 30-24-2 AND 30-4-1 THROUGH 30-41-3 NMSA 1978), WHICH PROHIBIT BRIBES, KICKBACKS AND GRATUITIES, VIOLATION OF WHICH CONSTITUTES A FELONY. FURTHER, THE PROCUREMENT CODE (13-1-28 THROUGH 13-1-199 NMSA 1978) IMPOSES CIVIL AND CRIMINAL PENALTIES FOR CODE VIOLATIONS.

**COLLUSION**

NO PROPOSER SHALL BE INTERESTED IN MORE THAN ONE PROPOSAL. COLLUSION AMONG PROPOSERS OR THE SUBMISSION OF MORE THAN ONE PROPOSAL UNDER DIFFERENT NAMES BY ANY FIRM OR INDIVIDUAL SHALL BE CAUSE FOR REJECTION OF ALL PROPOSALS WITHOUT CONSIDERATION.

## COUNTY OF OTERO INVITATION FOR BIDS

<b>GENERAL INSTRUCTIONS, TERMS AND CONDITIONS</b>
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**IMPORTANT: READ CAREFULLY BEFORE SUBMITTING BIDS. FAILURE TO DO SO SHALL NOT ABSOLVE THE BIDDER FROM RESPONSIBILITY TO PERFORM OR DELIVER AS SPECIFIED.**

1. **APPLICABILITY:** Except as otherwise specifically provided in this bid, these General Instructions, Terms and Conditions shall govern the procurement of the items specified in this bid. In the event of a conflict between these General Instructions, Terms and Conditions, Supplemental Conditions or the specifications of this bid, the order of application shall be the Specifications, Supplemental Conditions and the General Instructions, Terms and Conditions. In addition, the Public Purchases Ordinance and promulgated Rules and Regulations shall apply.
  
2. **DEFINITIONS:** As used in this bid, the definitions of the Public Purchases Ordinance apply including the following.
  - A. **"Bid"** means all documents, including those attached or incorporated by reference, issued by the Purchasing Department for soliciting offers to provide goods, services or construction.
  
  - B. **"Contract"** means any agreement for the procurement of goods, services, construction or concessions. A Purchase Order issued in response to an offer constitutes a contract.
  
  - C. **"Contractor"** means an offerer who has been awarded a contract.
  
  - D. **"County"** means the County of Otero, New Mexico.
  
  - E. **"Purchase Order"** means a document issued by the Purchasing Office directing the Contractor to deliver goods, services or construction.
  
  - F. **"Purchasing Office"** means the Purchasing Department of Otero County.
  
  - G. **"Purchasing Agent"** means the person charged with the responsibility of administering the Department.
  
  - H. **"Bidder"** means a business that submits a response to a competitive solicitation.



- I. **"Responsible Bidder"** means a business which has the capability in all respects to perform fully the contract requirements set out in the competitive solicitation, and the integrity and reliability which will assure good faith performance, and who has not violated or attempted to violate any provision of law or ethical conduct. Factors which may be considered in determining the offeror's capability to perform, among others, are its financial resources, production or service facilities, service reputation and experience.
- J. **"Responsive Bid"** means a written offer to furnish goods, services or construction in conformity with standards, specifications, delivery terms and conditions, and all other requirements established in a competitive solicitation.
- K. **"Successful Bidder"** means the lowest Responsible Bidder to whom Otero County, on the basis of the County's evaluation, makes an award. A Successful Bidder does not become a contractor until a purchase order is signed by the County.

3. **INSTRUCTIONS TO THE BIDDER**

Sealed Bids are desired from reputable manufacturers of automotive fire apparatus in accordance with the specifications for the apparatus as per attached. These specifications are assumed to be compliant with all current NFPA standards. ***If the vendor knows otherwise, the vendor will notify Otero County Purchasing immediately.***

The apparatus shall meet the detailed requirements of the most current and applicable NFPA Standard and these specifications and any special provision that may be attached.

Pursuant to Sec 13-1-188 NMSA, 1984 Comp., any state agency shall only purchase cars and trucks assembled in North America.

Any exceptions to the bid shall be listed separately and specifications attached are minimum requirements. The specifications submitted herein are all that were available to the Purchaser at the time of this mailing. Minor deviations to the specifications as listed, may be considered.

The apparatus shall be designed to meet the specified rating at 8,000 feet altitude and shall be subjected to off road use; thus engineering, design, and fabrication must allow for the additional stress and strain.

- A. **Submission:** All Bids must be submitted on the Invitation for Bids form enclosed. Failure to do so may disqualify your offer. It is the responsibility of the bidder to submit sufficient additional information to allow for a thorough evaluation of the bid submitted.
- B. **Preparation Method:** All information required in this Bid must be typewritten or handwritten in ink and must be legible. Erasures or other changes must be initialed by the person signing the offer. Each bid must be signed on the appropriate pages by an individual authorized to bind the bidder submitting the bid.
- C. **Unit Prices:** The unit price for each item offered shall be shown unless otherwise specified. **In the case of a discrepancy between the unit price and the extended price, the unit price will govern in determining the price used for evaluation.** Unit prices offered should be for the units specified.

- D. Delivery Time: Delivery time stated in the specifications shall apply. Deviations by the bidder shall be stated. Time, if stated in number of days, will be consecutive calendar days.
- E. Payment Terms: The Invitation for Bids form provides space for the bidder to identify the payment terms that the bidder is offering. Terms of less than twenty (30) days will not be considered. The discount term shall not begin until the goods, services or construction have been delivered and accepted and the correct invoice received in the County Accounts Payable Office.
- F. Freight Policy: Freight will be F.O.B. Destination (As indicated on the Invitation for Bids form), Freight Prepaid, unless otherwise specified in this Bid.
- G. Taxes: Bidders shall not include any applicable gross receipts taxes in its offered price, unless specified otherwise in this bid, and such offer will be construed in the manner. The County will, under appropriate circumstances, furnish a non-taxable transaction certificate. Determination of whether the tax is due and payment of the tax is the responsibility of the bidder. Applicable taxes are to be included in each invoice due and may not be billed more than sixty (60) days after providing the services to which the taxes apply.
- H. New Material, Etc.: All materials, supplies, equipment, and vehicles specified in this Bid shall be new, the latest in production and manufactured within the last twelve (12) months (computed from the date and time of offer opening) unless otherwise indicated. This does not apply to materials, supplies, equipment or vehicles used by the Contractor to provide the required items of tangible personal property, services or construction.
- I. Warranty: The bidder agrees that the items of tangible personal property, services or construction furnished under any contract resulting from this bid shall be covered by the most favorable commercial warranties the bidder gives to any customer for such items. Further, the bidder agrees that the rights and remedies provided in such warranties extend to the County and are in addition to and do not limit any rights afforded to the County by any other clause of this bid. The bidder agrees not to disclaim warranties of fitness for a particular purpose of merchantability. Warranties shall become effective at the time of acceptance.
- J. Equivalent Bids: Where a product is characteristic of a sole manufacturer, or where a brand name is indicated in the specifications, it shall be defined to mean "minimum acceptable level" or "minimum quality required" by the County unless the specifications state that no substitutions or equivalents will be allowed. If the bidder offers an item other than the one specified, which the bidder considers comparable, the manufacture's name and model number of that item must be specified in the bid and sufficient performance specification and descriptive data provided to permit a thorough evaluation. Failure to provide the appropriate information may result in disqualification of the bid.
- K. Exception to Specifications: Bidders are to state any exceptions taken to this bid the bidder is required to furnish the items exactly as specified and to comply with all other requirements of this bid. The bidder shall clearly note the variances and provide adequate documentation of proof that the alternate meets or exceeds specifications.
- L. Indemnity: The bidder to whom an award has been made as a result of this bid expressly agrees to defend, indemnify and save harmless the County and its officer, agents and employees from and against any and all claims, suits, demands, actions, or proceedings of every nature and description brought because of any injury or damage received or sustained by any person, persons, or property

arising out of the bidder's providing the goods, services for construction pursuant to the bid or by reason of any act or omission, neglect or misconduct of the bidder, the agents, employees or subcontractors of the bidder or the agents or employees of any subcontractor of the bidder. The indemnity required herein shall not be limited by reason of the specification of any particular insurance coverage.

- M. Patent Indemnity: If any item furnished pursuant to any contract resulting from this bid shall be covered by any patent, copyright, or application for patent or copyright, the bidder shall defend, indemnify and save harmless the County from any and all loss, cost or expense or any and all claims suits, or judgments as a result of the use of such item in violation of rights under such patent, copyright, or application for patent or copyright.
  
- N. Public Inspection: Each bid shall be open to public inspection, except to the extent the bidder designates trade secrets or other proprietary data to be confidential. Material so designated shall accompany the bid and each page shall be clearly marked and readily separable from the bid in order to facilitate public inspection of the non-confidential portion of the bid. Prices and makes and models or catalog numbers of the items offered, deliveries and terms of payment shall be publicly available at the time of the opening of the bid regardless of any designation to the contrary. The County shall endeavor to restrict distribution of the material designated as confidential to only those individuals involved in the review and analysis of the bids. Bidders are cautioned that materials designated confidential may nevertheless be subject to disclosure to any New Mexico citizen under the Inspection of Public Records Act (Sections 14-2-1 through 14-2-3 N.M.S.A. 1978)
  
- O. Material Safety Data Sheets: To comply with the Occupational Health and Safety Regulation 1910.1200 for general standards on handling hazardous materials, material safety data sheets may be required for all or part of the products included on this bid. It is the responsibility of the bidder to make this determination and, if required, a copy of the MSDS must accompany the product when delivered to the end user. Failure to comply with this requirement may cause the delivery of products to be rejected and all costs related to such action to be borne by the bidder.
  
- P. Pursuant to Sec 13-1-131 NMSA, 1984 Comp., as amended, Otero County reserves the right to reject any and all bids, whole or in part, submitted hereunder, provided that such rejections shall be accompanied by a written statement declaring the reason for the rejections.
  
- Q. Each bidder shall supply a blueprint drawing of the apparatus being proposed.
  
- R. If the awarded company fails to deliver the apparatus and equipment within the time specified, it is understood and the company agrees to the amount of one hundred dollars (\$100.00) per unit, per day for each calendar day any work remains incomplete, to a maximum of the contract price may be deducted from the moneys due the contractor, not as a penalty, but as liquidated damages.
  
- S. Bid proposal shall be accompanied by a certified check, Cashier check, or surety bond in the amount of ten (10) percent of the total price of the bid. The bid surety shall be made payable to this agency and conditioned upon the successful bidder accepting award and submitting an acceptable performance bond. In the event of failure of refusal to comply, the bid surety may be forfeited as liquidated damages because of such failure of default.

- T. Within fourteen (14) calendar days after the official notification of award, the successful bidder shall furnish a performance bond, which is equal to 100% of contract price. The successful bidder and surety shall agree to bind themselves their successors, executors, administrators and assigns, jointly and severally to deliver the fire apparatus to the specifications, general conditions and to the purchase order. This bond shall remain in force until vehicle and equipment have been delivered and accepted. Failure to deliver any part of the order to terms above may be considered by the purchaser as a breach of contract, in which case the fire apparatus and equipment may be rejected and the purchaser has the right to require forfeiture of the full amount of the performance bond as liquidated damages. The attorney's-in-fact, who signs the bonds, must file with the bonds a certificate copy of their power of attorney to sign such bonds.
- U. The awarded vendor is responsible for reporting all test results to the New Mexico State Fire Marshal's Office.
- V. A minimum of \$1,000,000.00 product liability insurance shall be provided and shall show the breakdown of:
  - General Aggregate (other than products, completed operations)
  - Products/completed operation aggregate
  - Personal and Advertising injury
  - Each Occurrence per Location
  - Umbrella/Excess Liability
- W. Please be advised, this contract is null and void if the apparatus does not meet all the requirements stated in the current applicable NFPA Standard.
- X. All purchases are governed by the statues of the State of New Mexico and the regulations of Otero County.
- Y. The awarded bidder shall guarantee for the minimum of period of one (1) year that all new equipment furnished under these specifications shall be free from defects. The vendor shall repair or replace all such defective equipment F.O.B., fire station site. Each bidder must furnish satisfactory evidence of his ability to have warranty work done and where work is to be done.
- Z. Each bidder shall furnish satisfactory evidence of their ability to construct the apparatus as specified and shall state the number of years the company has been actively engaged construction like or equal apparatus's. The location of the factory shall be disclosed.

You signature on the completed bid form will serve as a warranty that your bid is genuine and you agree with all contract provisions. A performance bond may be requested; no charge will be assessed to the County.

4. **ETHICAL CONDUCT:** By submitting its bid in response to this invitation, the bidder certifies that:

- A. It has not offered, given or agreed to give to any County employee or former employee, a gratuity or offer of employment to influence the preparation of or recommendation of award of this bid;
- B. It has not retained a person or solicited or secured a County Contract for a contingent fee;

- C. It has not taken any action in restraint of free competitive bidding in connection with this bid;
- D. It has not in any way violated the ethical conduct or other provisions of the County's Public Purchases Ordinance; and
- E. It currently has no interest and shall not acquire any interest, direct or indirect, which would conflict in any manner or degree with its performance of any contract resulting from this bid.

5. REQUESTS FOR EXPLANATIONS BY BIDDERS:

- A. Requests for Explanation: Any explanation desired by the bidder regarding the meaning or interpretation of specifications or any part of this bid must be requested in writing and received in the Purchasing Department not less than five (5) working days before the bid opening date.
- B. Response to Bids: Oral explanations or instructions given prior to the opening of the offer shall not be binding. The Purchasing Department must issue any official explanations, in writing.

6. ADDENDA:

Addenda: Changes or amendments to specifications, conditions or provisions herein may be initiated ONLY through the Purchasing Department in the form of a written addendum.

Any addenda shall become a part of this bid and should be acknowledged either by being signed and returned with the bid or through letter or telegram that arrives prior to the opening of the bid. Failure to do so may result in disqualification of the bid.

It is the responsibility of all vendors considering making a bid in response to this invitation to ensure that they have received all addenda prior to making a bid. Bidders may contact the Purchasing Department to obtain information regarding any addenda issued. Failure to obtain an addendum shall not be grounds for overturning a recommendation of award.

7. CLARIFICATION OF BIDS:

The County may, in the evaluation of bids, request clarification from bidders regarding their bid, obtain additional material or literature, and pursue other avenues of research as necessary to insure that a thorough evaluation is conducted.

8. SUBMISSION OF BID:

- A. Time: Bids not received by the time and date indicated on the Invitation for Bids will not be accepted, and will be returned unopened.
- B. Hand Carried: Bids may be hand carried to the Purchasing Department at 1101 New York Ave., Room 118, Alamogordo, New Mexico.
- C. Mailed: Bids may be mailed to the attention of the Purchasing Department, County of Otero, 1101 New York Ave., Room 118, Alamogordo, New Mexico 88310. The County shall not be responsible for bids that are mailed and not received by the opening date and time specified in the solicitation.

- D. **Envelope Preparation:** The envelope/package containing a bid must be sealed and the following identifying information legibly written or typed on the outside.
- 1). Name of Bidder
  - 2). Bid Number assigned by the County to the Invitation for Bids
  - 3). Opening date as identified on the bid or subsequent addenda
- E. **No Other Methods of Bid Delivery:** Neither telephone, telegraphic, nor facsimile bid shall be accepted.

9. **EQUAL OPPORTUNITY COMPLIANCE/WORKERS' COMPENSATION:**

Otero County does not discriminate on the basis of race, color, national origin, sex, religion, age, or disability in the employment or the provisions of services. The "Contractor" agrees to comply strictly with the policies of "County", as well as all Federal and State Laws pertaining to Equal Employment Opportunity, including the Americans with Disabilities Act, and will not discriminate against any person or deny any person participation or benefit from the performance of this Agreement as a result of any discriminatory action. The "Contractor" agrees to comply with State Laws and rules applicable to workers' compensation benefits for its employees. If the "Contractor" fails to comply with the Workers' Compensation Act and applicable rules when required to do so, the "County" may terminate this agreement.

10. **OSHA REQUIREMENTS IN EMPLOYMENT:**

Otero County shall contract with Companies or Firms whose operators and equipment meet OSHA (Occupational Safety and Health Administration) standards in their field of expertise.

11. **WITHDRAWAL OF BIDS:**

A bid may be withdrawn in person at any time BEFORE the scheduled opening of bids, provided a receipt for the withdrawn bids is signed by the bidder or the bidder's authorized representative. The County reserves the right to request proof of authorization to withdraw a bid.

12. **OPENING OF BIDS:**

Time and Place: Bids will be opened by the Purchasing Department at the time and place identified in this Bid. Openings are open to the public. Bidders are encouraged to attend.

13. **DISQUALIFICATION OF BID:**

The County reserves the right to reject a bid for, including but not limited to, any one or more of the following circumstances:

- A. In the past the bidder has failed to comply with previous contractual commitments or bids to the County.
- B. In the opinion of the County the bidder is not capable of providing the offered goods, services, or construction as offered or required by the bid or is otherwise not a responsible bidder.
- C. The bidder has not provided sufficient or detailed information which allows for the evaluation of the bid.

- D. In the opinion of the County the offered prices are higher than the prices for which the specified items or services can be purchased on the open market.
- E. The bidder failed to properly fill in any space on the Invitation for Bids form and attached documents where information or a signature is required.
- F. The bidder did not; at the time the bid is made, have an appropriate New Mexico Contractor's License or Certification when one is required by law, regulation or this Bid.
- G. The bidder failed to submit with their bid, bid bonds or other material requirements of the Bid or has otherwise submitted a non-responsive bid.
- H. There are unauthorized additions, conditions, alternate proposals or other irregularities of any kind which might make the bid incomplete, indefinite or ambiguous in meaning.
- I. Bid was not submitted in ink or typewritten or there is any erasure or alteration of words or figures relating to pricing which is not initialed in ink by the bidder.
- J. The County determines that a bid contains any misrepresentations whatsoever.

14. REJECTION/CANCELLATION OF BIDS:

Any solicitation, prior to opening or after opening, may be canceled or any or all bids may be rejected in whole or in part when it is in the best interest of the County.

15. MINOR OR TECHNICAL IRREGULARITIES:

Minor or technical irregularities in a bid, when there is no effect on price, quality or quantity may be waived and clerical errors in a bid may be corrected, if permitted by the Purchasing Officer and are in the best interest of the County.

16. NONCONFORMING/CONDITIONAL, OR COUNTER BIDS:

A bid which is nonconforming or conditional, whether in part or in whole will be rejected.

17. BID ANALYSIS:

The County reserves the right to analyze, examine and interpret any bid for a minimum period of sixty (60) consecutive calendar days, after the scheduled time for the opening of bids. Bids may not be rescinded during this period except for good cause and with the written approval of the Purchasing Officer. In those situations where the analysis/evaluation exceeds the sixty (60) calendar days, bidders may withdraw their bids from consideration.

18. AWARD OF CONTRACT:

- A. When Award Occurs: The award of a contract occurs when a Purchase Order is issued or other evidence of acceptance by the County if provided to the bidder. A Recommendation of Award does not constitute award of contract.

- B. Award: If a contract is awarded, it shall be awarded to the responsive and responsible bidder whose bid is lowest in total price and is the most advantageous to the County, specifications and other factors considered.
- C. Basis of Award: The County reserves the right to award a contract based on this Bid in total or by group of items, on the basis of individual items, or any combination of these, which in the judgment of the Purchasing Officer, best serves the interests of the County, unless otherwise stated in this Bid.
- D. Contract Changes: In no case shall a contract be changed without the prior written approval of the Purchasing Officer.
- E. To qualify for the five percent (5%) in state Resident Preference, the bidder must provide their assigned Resident Certification Number with their bid (an appropriate place is designated in the Bid Form). If a bidder does not provide their assigned Resident Certification Number with their bid, the bid shall not be considered as made by a resident business or a resident manufacturer and no preference shall be applied during the analysis of that bid.

**NOTE:** Your State Tax Number is NOT your Resident Certification Number.

19. PROTEST PROCESS:

- A. Any bidder who is aggrieved in connection with a solicitation or award of an Agreement may protest to the County of Otero Purchasing Agent in accordance with the requirements of the County of Otero's Procurement Regulations and the State Procurement Code. The protest should be made in writing within 24 hours after the facts or occurrences giving rise thereto, but in no case later than 15 calendar days after the facts or occurrences giving rise thereto.
- B. In the event of a timely protest under this section, the Purchasing Agent and the County of Otero shall not proceed further with the procurement unless the Purchasing Agent makes a determination that the award of Agreement is necessary to protect substantial interests of the County of Otero (13-1-173 NMSA 1978).
- C. The Purchasing Agent or his designee shall have the authority to take any action reasonably necessary to resolve a protest of an aggrieved bidder concerning procurement. This authority shall be exercised in accordance with adopted regulations, but shall not include the authority to award money damages or attorney's fees (13-1-174 NMSA 1978).
- D. The Purchasing Agent or his designee shall promptly issue a determination relating to the protest. The determination shall:
  - 1) State the reasons for the action taken; and
  - 2) Inform the Protestant of the right to judicial review of the determination pursuant to 13-1-183 NMSA 1978.
- E. A copy of the determination issued under 13-1-175 NMSA 1978 shall immediately be mailed to the Protestant and other bidders involved in the procurement (13-1-176 NMSA 1978).

20. DELIVERY, ACCEPTANCE AND GUARANTEE:

- A. No Delivery Before Purchase Order is Issued: No bidder, including the bidder to whom an award is made shall deliver any item of tangible personal property, commence services or construction prior to the  
  
Issuance of a Purchase Order or Notice to Proceed issued by the County Purchasing Department.
- B. Cancellation for Non-Delivery: The County reserves the right to cancel any order not delivered by a guaranteed date stipulated in this bid or any contract resulting from this invitation without liability on the County's part.
- C. Acceptance of Delivery: Acceptance by the County of any delivery shall not relieve the Contractor of any guarantee or warranty, expressed or implied. Such acceptance of delivery shall not be considered an acceptance of services or materials not in accordance with the specifications. Such acceptance of delivery shall not waive the County's right to require replacement of defective material or inadequate service.

21. INSPECTIONS:

- A. Prior To Acceptance of Delivery: All items of tangible personal property, services or construction shall be provided exactly as offered, and may be inspected prior to acceptance of delivery by the County.
- B. Inferior Materials, Etc.: All items of tangible personal property, services or construction found inferior to the quality specified in this Bid, deficient or incorrect in weight, measurement, workmanship, handicraft or otherwise, may be rejected as a whole or in part and then shall be removed by the Contractor at the Contractor's own risk and expense promptly after notice of rejection. The Contractor shall assume responsibility for taking the necessary action to correct or replace the rejected items, within the time frame specified in the notice of rejection.

22. INVOICE AND PAYMENTS:

The Contractor shall submit an accurate invoice, in duplicate, for each purchase. Invoices shall refer to the Purchase Order Number, the Release Form Number if applicable, and shall be itemized unless otherwise specified in this Bid. Invoices are to be mailed to: Otero County Accounts Payable, 1101 New York Ave., Alamogordo, New Mexico 88310. Invoices mailed or provided to any other entity will result in a delay in making payment. Offerors are encouraged to inquire if payments due are not received within thirty (30) days after delivery of goods/services and submittal of invoice by contracting the Accounts Payable at (575) 437-7427

23. DEFAULT/TERMINATION FOR CAUSE:

If, through any cause, the Contractor fails to fulfill the Contractor's obligations under any contract resulting from this Bid in a timely and proper manner, or if the Contractor violates any of the covenants, agreements or stipulations of such contract, the County shall notify the Contractor of such violations in writing and allow the Contractor a reasonable time, set out in the notice, to correct the default. If the default is not corrected within the specified time period the County shall have the right to cancel the contract and any or all other current contracts with the Contractor, and, if applicable, to purchase the

required goods or services from another source or sources. The County shall provide written notice to the Contractor specifying the effective date of cancellation. The notice of cancellation may be contained in the notice of default.

If a contract resulting from this Bid is canceled, the Contractor shall not be relieved of liability to the County for damages caused by its breach of the contract. The County reserves the right to recover such damages, including but not limited to any excess cost incurred in having to purchase contract goods/services from other sources by a deduction from an unpaid balance due to the Contractor, collection against a performance or labor and materials payment bond, a combination of these remedies, or any other legal method available. In addition, the Contractor may be removed from the Purchasing Office Vendor List or determined to be ineligible to respond to future solicitations, as being not responsible.

24. TERMINATION FOR THE CONVENIENCE OF THE COUNTY:

The County may terminate any contract resulting from this Bid at any time by giving at least thirty (30) days' notice in writing of such termination to the Contractor. In such event, the Contractor shall be paid under the terms of the contract for all goods/services provided to and accepted by the County, if ordered or accepted by the County prior to the effective date of termination.

25. TERMINATION FOR LACK OF APPROPRIATIONS:

Funding for the contract resulting from this Bid has been appropriated by the County Commission for the County's current fiscal year. Notwithstanding any other provisions in the contract resulting from this Bid, its continuation beyond the end of the any fiscal year is contingent on the County Commission making the appropriations necessary to fund the contract. If sufficient appropriations are not made the contract may be terminated at the end of the County's then current fiscal year upon written notice given by the County to the Contractor. Such termination shall not constitute a default. All payment obligations of the County and all of its interest in the contract will cease upon the date of termination. The County's decision as to whether sufficient appropriations are available shall be accepted by the Contractor and shall be final.

26. CAMPAIGN CONTRIBUTION FORM

In accordance with Appendix C, Offerors must comply with 13-1-191.1 pertaining to the disclosure of campaign contributions to an applicable public official of a local public body.

**Offeror(s) shall submit the "Campaign Contribution Disclosure Form" with their proposal submittal. Any Offeror who fails to comply with this requirement will be disqualified, no exceptions. (MUST BE SIGNED)**

27. **UTILIZE BD**

In accordance with NMSA 13-1-129 of the procurement code, offerors are hereby notified that other government entities within the State of New Mexico, or as otherwise allowed by their respective governing directives, may contract for the goods or services included in this procurement document with the awarded contractor. Contractual engagements accomplished under this provision shall be solely between the awarded vendor and the contracting government entity with no obligation by Qtero County.

Sealed Bid #17-001

Opening Date: 6/29/16

Time: 3:00 PM

**B I D F O R M  
FIRE APPARATUS  
BOLES ACRES VFD  
VOLUNTEER FIRE DEPARTMENT**

**\*\*SEE ATTACHED SPECIFICATIONS---**

YEAR: \_\_\_\_\_

MAKE: \_\_\_\_\_

MODEL: \_\_\_\_\_

WARRANTY: \_\_\_\_\_

DELIVERY DATE: \_\_\_\_\_

SERVICE: \_\_\_\_\_  
LOCATION OF AVAILABLE SERVICE

THIS OFFER IS GOOD FOR A PERIOD OF: (MINIMUM 60 DAYS) \_\_\_\_\_

**TOTAL PRICE: \$** \_\_\_\_\_

\_\_\_\_\_  
PRINT NAME OF AUTHORIZED REPRESENTATIVE

\_\_\_\_\_  
SIGNATURE OF AUTHORIZED REPRESENTATIVE/DATE

EMAIL ADDRESS: \_\_\_\_\_

\_\_\_\_\_  
INSTATE BIDDERS PREFERENCE NUMBER

**OTERO COUNTY PURCHASING  
TERMS & CONDITIONS  
UNLESS OTHERWISE SPECIFIED.**

1. **BIDS ARE TO COMPLY WITH ALL INSTRUCTIONS AND PROVIDE THE INFORMATION REQUESTED. FAILURE TO DO SO MAY DISQUALIFY YOUR BID.** All bid items are to be NEW and of most current production, unless otherwise specified.
2. Samples of items, when required, must be furnished free of expense prior to the opening of bids and if not destroyed, will, upon request, be returned at the bidders expense.
3. Prices should be stated in units or quantity specified, with packing included. All deliveries will be F.O.B. Alamogordo, NM unless otherwise specified.
4. Time or proposed delivery must be stated in definite terms. If time varies for different items, the bidder should so state.
5. Time of delivery shall be stated as the number of calendar days following receipt of the order either verbally or in writing, whichever is received first by the vendor, to receipt of the goods or services by Otero County.
6. Time of delivery may be a consideration in the award.
7. **Envelopes containing bids must be sealed and marked with name, address of the bidder, due date, and bid number.**
8. **IMPORTANT:** Bids not received in the office of the Purchasing Agent at the time of opening are disqualified and will be returned unopened.
9. Corrections and/or modifications received after the opening time specified will not be accepted.
10. Where an item is specified by brand name and numbers these are used in these specifications as a matter of convenience to indicate quality, type, and features desired. Accordingly demonstrably equal merchandise will be given full consideration and the bidder is invited to offer such, except where it is clearly stated that such brand names and/or models are specified for the purpose of standardization. Any "or equal" items offered must be substantially equal to the appearance, design, dimensions, approximate cost of the item specified, and must be of equivalent materials, function, and sturdiness of construction of the item specified. Any deviation from specifications must be clearly itemized by the bidder.  
When offering substitutions, please specify, and include descriptive literature.
11. When brand, number, or level of quality is not stated by the bidder, it is understood the offer is exactly as specified.
12. Otero County is exempt from paying sales tax for materials and federal excise taxes. Do not include those taxes in bid. A nontaxable transaction certificate will be provide when payment is made. Services and tax on labor only are not exempt.
13. If your bid is accepted, you will receive notification either verbally or in writing by an issuance of a Purchase Order Number authorizing you to make delivery. Only the accepted bidder will be notified of awards.
14. **ATTENTION BOOKKEEPING & AUDITING DEPARTMENTS:** Complete payment will be made only when entire order is filled, with the exception of "Open Order Purchases", unless otherwise stated on purchase order. **EXCEPTION: Partial payments will be allowed upon written notification and approval if order cannot be completed in a single shipment.** Payment terms are Net 30 days unless otherwise stated.
15. All addenda so issued shall become part of the bid documents.
16. Pricing shall remain effective for a minimum of thirty  
(30) days after bid opening date.

**CONDITIONS**

1. The Purchasing Agent reserves the right to reject any and all bids, to waive any informality in bids, and **unless** otherwise specified to the bidder, to accept any item on the bid.
2. In case of error in the extension of prices in the bid, the unit price will govern.
3. Prompt payment discounts will not be considered in computing the low bid. Otero County will take advantage of cash discounts offered wherever possible.
4. Time in connection with discount offered will be computed from date of delivery or from date correct invoice is received, whichever is later.
5. Final inspection and acceptance will be made at the destination. Supplies rejected at the destination for non-conformance with specifications shall be removed at the vendor's risk and expense, promptly after notice of rejection.
6. Otero County requires vendor certification be the New Mexico State Purchasing Agent before the 5% in-state bidding preference can be extended. Bidders claiming this preference must show certification number on bid and must be prepared to show evidence of certification for the commodity being bid. In-state vendors: failure to secure above will result in non-considerations of any preference for in-state bidders. This will not apply when Federal funds are used, Chapter 13-1-21.
7. Otero County reserves the right to award by item, group of items, or total bids; to reject any and all bids in whole or in part if, in the judgment of the Purchasing Agent, the best interests of Otero County will be served.
8. The Otero County Purchase Order Number shall be shown on all packing, delivery tickets, and other correspondence in connection with the shipment. The user's count will be accepted by the Vendor as final and conclusive on all shipments not accompanied by a packing ticket.  
The Vendor's invoice shall be submitted and contain the following information: order number, description of supplies or services, quantities, unit prices, and extended totals. Separate invoices shall be rendered for each and every complete shipment.
9. Otero County reserves the right to cancel all or any part of this order without cost to the County, if the Vendor fails to meet the provisions of this order and, except as otherwise provided herein, to hold the Vendor liable for any excess cost occasioned by the County due to the Vendor's default. The Vendor shall not be liable for any excess costs if failure to perform the order arises out of cause beyond the control and without the fault or negligence of the Vendor, such causes include, but are not restricted to, acts of God or of the public enemy, acts of the State or of the Federal Government, fires, goods, epidemics, quarantine restrictions, strikes, freight embargo's, unusually severe weather, and defaults of subcontractors due to any of the above, unless Otero County shall determine that the supplies or services to be furnished by the subcontractor were obtainable from other sources in sufficient time to permit the Vendor to meet the required delivery scheduled. The rights and remedies of the county provided in this paragraph shall not be exclusive and are in addition to any other rights now being provided by law or under this order.

10. In signing this bid or accepting Purchase Order, the Vendor certifies he/she has not, either directly or indirectly, entered into action in restraint of free competitive bidding in connection with this proposal submitted to Otero County Purchasing Agent.

11. Sections 13-1-28 through 13-1-199 NMSA 1978, imposes civil and criminal penalties for its violation. The New Mexico criminal statutes impose felony penalties for bribes, gratuities, and kickbacks.

12. **THIS BID/AWARD IS CONTINGENT UPON AVAILABLE FUNDING.**

(terms)

rev 05/96

## CAMPAIGN CONTRIBUTION DISCLOSURE FORM

Pursuant to the Procurement Code, Sections 13-1-28, et seq., NMSA 1978 and NMSA 1978, § 13-1-191.1 (2006), as amended by Laws of 2007, Chapter 234, any prospective contractor seeking to enter into a contract with any state agency or local public body **for professional services, a design and build project delivery system, or the design and installation of measures the primary purpose of which is to conserve natural resources** must file this form with that state agency or local public body. This form must be filed even if the contract qualifies as a small purchase or a sole source contract. The prospective contractor must disclose whether they, a family member or a representative of the prospective contractor has made a campaign contribution to an applicable public official of the state or a local public body during the two years prior to the date on which the contractor submits a proposal or, in the case of a sole source or small purchase contract, the two years prior to the date the contractor signs the contract, if the aggregate total of contributions given by the prospective contractor, a family member or a representative of the prospective contractor to the public official exceeds two hundred and fifty dollars (\$250) over the two year period.

Furthermore, the state agency or local public body may cancel a solicitation or proposed award for a proposed contract pursuant to Section 13-1-181 NMSA 1978 or a contract that is executed may be ratified or terminated pursuant to Section 13-1-182 NMSA 1978 of the Procurement Code if: 1) a prospective contractor, a family member of the prospective contractor, or a representative of the prospective contractor gives a campaign contribution or other thing of value to an applicable public official or the applicable public official's employees during the pendency of the procurement process or 2) a prospective contractor fails to submit a fully completed disclosure statement pursuant to the law.

The state agency or local public body that procures the services or items of tangible personal property shall indicate on the form the name or names of every applicable public official, if any, for which disclosure is required by a prospective contractor.

**THIS FORM MUST BE INCLUDED IN THE REQUEST FOR PROPOSALS AND MUST BE FILED BY ANY PROSPECTIVE CONTRACTOR WHETHER OR NOT THEY, THEIR FAMILY MEMBER, OR THEIR REPRESENTATIVE HAS MADE ANY CONTRIBUTIONS SUBJECT TO DISCLOSURE.**

The following definitions apply:

**“Applicable public official”** means a person elected to an office or a person appointed to complete a term of an elected office, who has the authority to award or influence the award of the contract for which the prospective contractor is submitting a competitive sealed proposal or who has the authority to negotiate a sole source or small purchase contract that may be awarded without submission of a sealed competitive proposal.

**“Campaign Contribution”** means a gift, subscription, loan, advance or deposit of money or other thing of value, including the estimated value of an in-kind contribution, that is made to or received by an applicable public official or any person authorized to raise, collect or expend contributions on that official's behalf for the purpose of electing the official to statewide or local office. “Campaign Contribution” includes the payment of a debt incurred in an election campaign, but does not include the value of services provided without compensation or unreimbursed travel or other personal expenses of individuals who volunteer a portion or all of their time on behalf of a candidate or political committee, nor does it include the administrative or solicitation expenses of a political committee that are paid by an organization that sponsors the committee.

**“Family member”** means spouse, father, mother, child, father-in-law, mother-in-law, daughter-in-law or son-in-law of (a) a prospective contractor, if the prospective contractor is a natural person; or (b) an owner of a prospective contractor.

**“Pendency of the procurement process”** means the time period commencing with the public notice of the request for proposals and ending with the award of the contract or the cancellation of the request for proposals.

**“Prospective contractor”** means a person or business that is subject to the competitive sealed proposal process set forth in the Procurement Code or is not required to submit a competitive sealed proposal because that person or business qualifies for a sole source or a small purchase contract.

**“Representative of a prospective contractor”** means an officer or director of a corporation, a member or manager of a limited liability corporation, a partner of a partnership or a trustee of a trust of the prospective contractor.

Name(s) of Applicable Public Official(s) if any: \_\_\_\_\_  
(Completed by State Agency or Local Public Body)

**DISCLOSURE OF CONTRIBUTIONS BY PROSPECTIVE CONTRACTOR:**

Contribution Made By: \_\_\_\_\_

Relation to Prospective Contractor: \_\_\_\_\_

Date Contribution(s) Made: \_\_\_\_\_  
\_\_\_\_\_

Amount(s) of Contribution(s) \_\_\_\_\_  
\_\_\_\_\_

Nature of Contribution(s) \_\_\_\_\_  
\_\_\_\_\_

Purpose of Contribution(s) \_\_\_\_\_  
\_\_\_\_\_

(Attach extra pages if necessary)

\_\_\_\_\_  
Signature Date

\_\_\_\_\_  
Title (position)

**-OR-**  
**NO CONTRIBUTIONS IN THE AGGREGATE TOTAL OVER TWO HUNDRED FIFTY DOLLARS (\$250) WERE MADE** to an applicable public official by me, a family member or representative.

\_\_\_\_\_  
Signature Date

\_\_\_\_\_  
Title (Position)

## Resident Veterans Preference Certification

\_\_\_\_\_ (NAME OF CONTRACTOR) hereby certifies the following in regard to application of the resident veterans' preference to this procurement:

**PLEASE CHECK ONLY ONE STATEMENT FROM THE FOUR (4) STATEMENT LISTED BELOW**

\_\_\_\_\_ I declare that my firm is ineligible to receive New Mexico Resident Veterans Preference

**The following three (3) checkboxes are applicable to ONLY those vendors eligible to receive New Mexico Resident Veterans Preference AND who have included a valid New Mexico Resident Veterans Preference certificate with their sealed response. No preference will be extended unless a valid certificate is included in your sealed response. Submitted certificates shall be validated by Otero County with New Mexico Tax & Revenue**

I declare under penalty of perjury that my business prior year revenue starting January 1 ending December 31 is less than \$1M allowing me the 10% preference discount on this solicitation. I understand that knowingly giving false or misleading information about this fact constitutes a crime.

I declare under penalty of perjury that my business prior year revenue starting January 1 ending December 31 is more than \$1M but less than \$5M allowing me the 8% preference discount on this bid or proposal. I understand that knowingly giving false or misleading information about this fact constitutes a crime.

I declare under penalty of perjury that my business prior year revenue starting January 1 ending December 31 is more than \$5M allowing me the 7% preference discount on this bid or proposal. I understand that knowingly giving false or misleading information about this fact constitutes a crime.

"I agree to submit a report, or reports, to the State Purchasing Division of the General Services Department declaring under penalty of perjury that during the last calendar year starting January 1 and ending on December 31, the following to be true and accurate:

"In conjunction with this procurement and the requirements of this business' application for a Resident Veteran Business Preference/Resident Veteran Contractor Preference under Sections 13-1-21 or 13-1-22 NMSA 1978, when awarded a contract which was on the basis of having such veterans preference, I agree to report to the State Purchasing Division of the General Services Department the awarded amount involved. I will indicate in the report the award amount as a purchase from a public body or as a public works contract from a public body as the case may be.

"I understand that knowingly giving false or misleading information on this report constitutes a crime."

I declare under penalty of perjury that this statement is true to the best of my knowledge. I understand that giving false or misleading statements about material fact regarding this matter constitutes a crime.

\_\_\_\_\_  
(Signature of Business Representative)\*      \_\_\_\_\_  
(Date)

*\*Must be an authorized signatory for the Business. The representations made in checking the boxes constitutes a material representation by the business that is subject to protest and may result in denial of an award or termination of an award if the statements are proven to be incorrect.*

**NON-COLLUSION AFFIDAVIT**

STATE OF \_\_\_\_\_)

County OF \_\_\_\_\_)

\_\_\_\_\_ (name) being first duly sworn, deposes and says  
that he/she is (title) \_\_\_\_\_  
of (organization) \_\_\_\_\_

who submits herewith to the County of Otero, proposal; That all statements of fact in such proposal are true; That said proposal was not made in the interest of or on behalf of any undisclosed person, partnership, company, association, organization or corporation;

That said bidder has not, directly or indirectly by agreement, communication or conference with anyone attempted to induce action prejudicial to the interest of the County of Otero, or of any bidder of anyone else interested in the proposed contract; and further,

That prior to the public opening and reading of proposal, said bidder;

1. Did not directly or indirectly, induce or solicit anyone else to submit a false or sham proposal
2. Did not directly or indirectly collude, conspire, connive or agree with anyone else that said bidder or anyone else would submit a false or sham proposal, or that anyone should refrain from bidding or withdraw his proposals;
3. Did not in any manner, directly or indirectly, seek by agreement, communication or conference with anyone to raise or fix the proposal price of said bidder or of anyone else, or to raise or fix any overhead, profit or cost element of their proposal price, or of that of anyone else;
4. Did not directly or indirectly, submit his proposed price or any breakdown thereof, or the contest thereof, or divulge information or data relative thereto, to any corporation, partnership, company, association organization, bid depository or to any member or agent thereof, or to any individual of group of individuals, except that County of Otero, or to any person or persons who have a partnership or other financial interests with said bidder in his business.

By: \_\_\_\_\_

Title: \_\_\_\_\_

SUBSCRIBED and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

Notary Public: \_\_\_\_\_

My Commission Expires: \_\_\_\_\_

# BOLES ACRES FIRE DEPARTMENT 80' AERIAL SPECIFICATIONS

## NFPA 1901-2016

The National Fire Protection Association "Standard for Automotive Fire Apparatus, 2016 Edition, is hereby adopted and made a part of these specifications, the same as if it were written out in full detail, with the exception of the section dealing with "Equipment Recommended for Various Types of Apparatus". Bidders shall provide the equipment specifically requested herein and the buyer shall supply the rest before the apparatus is put into service.

Y\_\_\_ N\_\_\_

## PAINT CODES AND BASIC ATTRIBUTES

### **Paint Information**

Paint Manufacturer: PPG to match existing apparatus

Y\_\_\_ N\_\_\_

## CAB EXTERIOR, BODY PAINT

Single Color: RED, paint code: 74048

Y\_\_\_ N\_\_\_

## FRAME PAINT COLOR

Frame Color: hot dip galvanized to be unpainted

Y\_\_\_ N\_\_\_

## CUSTOM CHASSIS - SINGLE SOURCE MANUFACTURER

The chassis shall be designed and manufactured by the apparatus builder in the manufacturer's facility. The manufacturer shall demonstrate evidence of manufacturing similar custom vehicles for at least fifty (50) years. The apparatus is expected to have a 20 year service life.

Bids shall only be accepted from a single source apparatus manufacturer. The definition of single source shall be "a manufacturer that designs and manufactures their products using an integrated approach, including the cab and chassis, pump module, and apparatus body being fabricated and assembled on the bidder's premises". The warranties relative to the chassis and body design (excluding component warranties such as engine, transmission, axles, pump, etc.) must be from a single source manufacturer and not split between manufacturers (i.e. body and chassis). The bidder shall provide evidence that they comply with this requirement. No exceptions will be permitted to this section of the document.

The chassis shall be designed and manufactured for heavy duty fire service with adequate strength and capacity for all components as detailed within these specifications.

Y\_\_\_ N\_\_\_

## CHASSIS FRAME

The frame shall be designed to industry standards. The manufacturer shall provide a lifetime frame side rail warranty to the original purchaser of the chassis. The frame rails shall be 10.5" x 3.5" x .375" heat treated steel.

A 3/4 length inner frame side rail liner with dimensions of 9.687" x 3.125" x .3125" shall be provided for additional strength and reduce deflection. The frame liner shall extend from the centerline of the front axle and taper 45 degrees forward and shall extend to the rear of the main frame rail.

The frame side rails shall be 110,000 psi minimum yield and shall have a minimum section modulus of 30.38 cu. in., in the frame liner area, calculated by using the square corner shape method. The resulting frame rail resistance to bending moment shall be 3,341,800 in. lb. per rail.

To insure the maximum clamp load for the fastener prevailing torque the crossmembers shall be bolted in place using grade 8 bolts, hardened washers, and grade "C" distorted thread locknuts. Flanged head fasteners shall not be acceptable. The top of the frame rails shall be free of bolt heads.

Frame engine cutouts shall be made with a plasma torch to minimize the heat affected zone of the cut. All cutouts shall have a minimum of 6 inch transitions between rail flange cut depths to reduce the stress concentrations throughout the cutout area. The root of all transition areas shall have a minimum of a 2 inch radius to reduce stress concentrations at the root.

The main frame rails, frame liner and main frame crossmembers behind the pump shall be galvanized to reduce the effect of harsh road chemicals. This warranty shall be in effect for 20 years after delivery of the apparatus to the end user.

Y\_\_\_\_ N\_\_\_\_

**CAB MAIN FRAME CROSSMEMBER**

In addition to the rear cab support crossmember there shall be a main frame cross member mounted in the rear cab area. This cross member shall be a wide base flanged design to provide frame spacing and excellent strength to prevent frame paralleling. Every frame cross member shall be bolted in place using grade 8 bolts, hardened washers, and grade "C" distorted thread locknuts.

Y\_\_\_\_ N\_\_\_\_

**FRAME WARRANTY**

The Frame Warranty is in effect for a Warranty Period that continues until the date that is the expected lifetime of a new vehicle. For purposes of this Frame Warranty, the expected lifetime is 20 years from the original delivery date.

Y\_\_\_\_ N\_\_\_\_

**FRONT AXLE**

The front axle shall be a MERITOR model "MFS20-133A-N" with a 21,500 lb. capacity.

Y\_\_\_\_ N\_\_\_\_

**CRAMP ANGLE**

The chassis shall have a turning cramp angle of 45-degrees. Both left and right turns have a full 45° cramp angle with tires and wheels mounted on the axle and installed in the chassis. The 45° cramp angle is achieved irrespective of options such as front suctions and disc brakes.

Y\_\_\_\_ N\_\_\_\_

**FRONT AXLE OIL SEALS**

The front axle shall be equipped with oil bath type oil seals as supplied on the axle from the axle manufacturer. The spindles shall be equipped with transparent covers for oil level inspection.

Y\_\_\_\_ N\_\_\_\_

**FRONT AXLE DISC BRAKES**

MERITOR DiscPlus, EX-225, air disc brakes shall be installed on the front axle. The DiscPlus air disc brakes shall provide improved fade resistance and wet weather performance. The rotors shall be vented to facilitate brake cooling.

Y\_\_\_\_ N\_\_\_\_

**FRONT SUSPENSION**

The front suspension shall be a pin and shackle design. Front springs shall be a minimum of nine (9) leaf elliptical type, 53" x 3-1/2" x .5" forged steel. The front springs shall have a military wrapper for safe operation. For a smooth ride the spring rate shall not exceed 3,300 lbs/in deflection.

All front spring pins shall be ground heat treated steel with grease fittings for lubrication.

The entire front suspension shall be designed for heavy duty custom fire apparatus.

Double acting hydraulic shock absorbers are to be installed.

Y\_\_\_\_ N\_\_\_\_

**STEERING SYSTEM**

The steering shall be equipped with dual SHEPPARD integral power steering gears. The engine shall be equipped with a gear driven pump.

A remote steel reservoir shall be provided with the ability to check the fluid level when the cab is in the lowered position.

Y\_\_\_\_ N\_\_\_\_

**FRONT TIRES**

The front tires shall be 425/65R22.5-20PR (L) GOODYEAR G-296 MSA tread, tubeless radial tires. These tires shall be mounted on 22.5" x 13.00" rims.

Y\_\_\_\_ N\_\_\_\_

**STANDARD LOAD RATING**

The front axle GAWR using these tires shall be 22,800 lbs. @ 120 psi.

Y\_\_\_\_ N\_\_\_\_

**TIRE SPEED RATING**

The maximum tire speed rating is 65 MPH.

Y\_\_\_\_ N\_\_\_\_

**ALUMINUM WHEELS**

Two (2) polished aluminum wheels shall be supplied and installed on the front axle. The 22.5" x 13.00" wheels shall be highly polished on the outboard side.

Y\_\_\_\_ N\_\_\_\_

**FRONT WHEEL TRIM**

The front axle shall be trimmed with mirror finish, 304L grade, non-corrosive stainless steel 'baby moon' hub caps with an opening for viewing the oil seal cover, and bright finished nut covers.

Y\_\_\_\_ N\_\_\_\_

**SINGLE REAR AXLE**

The rear axle shall be a Spicer model "S35-590" with a 33,000# capacity for the fire service.

Y\_\_\_\_ N\_\_\_\_

**REAR AXLE OIL SEALS**

The rear axle shall be equipped with premium oil bath type oil seals as supplied on the axle from the axle manufacturer.

Y\_\_\_\_ N\_\_\_\_

**REAR AXLE BRAKES**

The rear brakes shall be Cam type, 16-1/2" X 7" (419 x 178), S-Cam, air operated heavy duty brakes for increased stopping power and brake life in severe braking applications.

The "S" cam brakes shall incorporate a double anchor pin design, for stability and smooth consistent stopping. The camshafts shall be heat treated with rolled spline construction.

The rear axle shall be equipped with automatic slack adjusters (ASA) to provide optimum brake performance.

Y\_\_\_\_ N\_\_\_\_

**VEHICLE TOP SPEED**

The rear axle shall be geared for a top speed of 62 to 65 mph at engine governed RPM.

Y\_\_\_\_ N\_\_\_\_

**SINGLE AXLE REAR SUSPENSION**

The rear springs shall be an air ride suspension rated at 33,000 pounds GAWR. The suspension shall be of the leading arm design with a fore and aft torque rod. A transverse torque rod shall be installed to provide roll stability.

A twin leveling valve system shall be employed for suspension ride height control.

Dual heavy duty shock absorbers shall be installed on the rear suspension.

Y\_\_\_\_ N\_\_\_\_

**AIR SYSTEM**

An air brake system meeting the requirements of the FMVSS-121 shall be provided. The system shall consist of three (3) reservoirs with a 4,362 cu. in. volume. The air system shall consist of the following components:

Dual air system with dual gauges and a warning light and buzzer.

A spring actuated parking brake built into the rear axle brakes with a manual control and warning light the in cab. These shall automatically apply in case of air system failure. A mechanical means of releasing the spring brake shall be provided in the event of total loss of air pressure.

A quick build up system shall be provided, capable of building enough air pressure to release the spring brake in less than thirty (30) seconds, when starting with the entire air system at zero pounds pressure.

The brake system shall be a split system. One (1) system serving the rear brakes and one (1) system serving the front brakes. The two (2) systems shall be connected with a double check valve that shall automatically shuttle air from the front system to the rear system should loss of air pressure occur. This system shall also modulate the amount of air so the spring brakes shall apply in direct relationship to the amount of pressure applied to the treadle valve.

The brake system shall be equipped with a Bendix SR-7 valve to provide modulated spring brakes in the event there is low air pressure in the rear axle air supply reservoir.

The spring brakes shall be piped in such a manner that if the treadle valve is depressed while the spring brakes are applied, the spring brakes shall release and remain released as long as the treadle valve is depressed. They shall reapply immediately when the treadle valve is released.

The piping in the air system shall be 2-ply nylon reinforced color coded tubing for all stationary lines.

Y\_\_\_\_ N\_\_\_\_

**AIR DRYER**

The air dryer shall have a spin off desiccant cartridge.

The air dryer shall incorporate an integral turbo cutoff valve. The turbo cutoff valve shall close the path between the air compressor and the air dryer purge valve during the compressor "unload" cycle. This shall allow the air dryer to purge the water and contaminates without any loss of turbo boost or engine horsepower.

A 12 volt heated moisture ejector shall be an integral part of the air dryer. This heater shall be thermostatically controlled. The electrical connection for the heater shall use a sealed electrical connector to protect against moisture and corrosion.

Y\_\_\_\_ N\_\_\_\_

**ACCESSORY AIR RESERVOIR**

One (1) 2181 cu. in. additional reservoir shall be connected to the chassis air system to provide an air supply for accessories such as air powered tools. This reservoir shall include a pressure protection valve on the inlet side to allow full use of this tank without draining air from the chassis air system.

Y\_\_\_ N\_\_\_

**MANUAL AIR TANK DRAINS**

All air reservoirs shall have manual 1/4 turn drain valves. The drain valves shall be supplied with rubber seats to reduce air system leaks. The reservoir drain valves shall allow the accumulation of contaminants that are collected in the reservoirs to be drained off to the atmosphere.

Y\_\_\_ N\_\_\_

**FRONT AXLE SERVICE BRAKE LOCKING SYSTEM**

The chassis shall be equipped with a front axle service brake locking system. This system shall be independently operated with a separate selector on the dash. This selector shall be labeled "Front Brake Lock". The control circuit for this system shall only allow application of the front axle service brake engagement when the rear axle parking brakes are applied.

Y\_\_\_ N\_\_\_

**MERITOR/ROCKWELL/WABCO ABS BRAKE SYSTEM**

A four channel, single rear axle model, MERITOR/ROCKWELL/WABCO ABS Braking System shall be supplied.

A frame mounted electronic control unit (ECU) shall monitor and control wheel speed during braking. Wheel sensors, constantly monitoring wheel speed, send information to the ECU. If a wheel begins to lock the ECU transmits an electrical impulse to modulator valves that can apply, release or hold the air pressure in the brake chambers. The rapid modulation of air pressure prevents wheel lock-up and increases driver control.

This ABS system shall be a 4S/4M system with four (4) wheel speed sensors and four (4) modulator valves.

If a fault occurs in one wheel, that wheel shall have normal (non-ABS) brake function. The other wheels shall continue to provide the ABS function. If the ABS system should fail completely, the brake control shall be returned to normal (non-ABS) braking.

An ABS warning light shall be installed on the driver's dash message center. This warning light shall cycle through a test stage at the point of ignition turn on and remain illuminated until the vehicle reaches approximately four (4) MPH. The light shall illuminate in other conditions to warn of an ABS system failure and shall illuminate when the diagnostic function is activated.

Y\_\_\_ N\_\_\_

**DEEP MUD/SNOW SWITCH**

Meritor/Rockwell/Wabco ABS shall be supplied with deep mud and snow switch. This switch shall increase the ATC threshold to permit more wheel spin before ATC begins to take effect.

Y\_\_\_ N\_\_\_

**MERITOR/WABCO STABILITY ENHANCEMENT SYSTEM**

A Meritor / Wabco Roll Stability Control (RSC) System shall be provided on the apparatus chassis. The RSC shall assist in managing road conditions that may result in a vehicle rollover.

The RSC shall intervene to regulate the vehicle's deceleration functions. by automatically reducing engine torque, engage the vehicle retarder and apply pressure to the brakes.

Electronic Stability Control (ESC) shall be included building upon the established RSC system by sensing the tendency of the vehicle to spin around and automatically applying the brakes to reduce that risk.

This system shall conform to the requirements of NFPA-1901 4.13.1.2 - If the apparatus is equipped with a stability control system, the system shall have, at a minimum, a steering wheel position sensor, a vehicle yaw sensor, a lateral accelerometer, and individual wheel brake controls.

Y\_\_\_ N\_\_\_

**REAR TIRES**

The rear tires shall be 315/80R22.5-20PR (L) GOODYEAR G-291 all-weather tread, tubeless radial tires. These tires shall be mounted on 22.5" x 9.00" rims.

Single rear axle Intermittent Service rating shall be 34,500 lbs. @ 130 psi.

Y\_\_\_ N\_\_\_

**TIRE SPEED RATING**

The maximum tire speed rating is 68 MPH.

Y\_\_\_ N\_\_\_

**ALUMINUM WHEELS**

Four (4) polished aluminum wheels shall be supplied in the outer wheel position of the rear axle. The 22.5" x 9.00" wheels shall be highly polished on the outboard side.

Y\_\_\_ N\_\_\_

**REAR WHEEL TRIM**

The rear axle(s) shall be trimmed with mirror finish, 304L grade non-corrosive stainless steel "Lincoln Hat" hub cover and bright finished nut covers.

Y\_\_\_ N\_\_\_

**LASER ALIGNMENT**

The chassis shall have a laser alignment performed at the factory before delivery.

Y\_\_\_ N\_\_\_

**TIRE PRESSURE MONITORING DEVICE**

Each tire installed on the apparatus shall be equipped with a tire pressure monitoring device. The device shall consist of a valve stem cap to with an LED tire alert to indicate tire pressure conditions. The LED will flash when the tire drops 8 psi below the factory setting.

Y\_\_\_ N\_\_\_

**DIESEL ENGINE**

The chassis shall be powered by a Cummins diesel engine as described below:

MODEL:	ISX12-500
NUMBER OF CYLINDERS:	Six
BORE AND STROKE:	5.11 in (130 mm) X 5.91 in (150 mm)
DISPLACEMENT:	729 cu. in. (11.9L)
RATED BHP:	500 hp (373 kW) @ 1800 rpm 460 hp (343 kW) @ 2100 rpm
TORQUE:	1645 lb-ft (2232 N-m) @ 1200 rpm
COMPRESSION RATIO:	17.1:1
GOVERNED RPM:	2100

Standard Equipment on the engine to include the following:

OIL FILTER:	A full flow / by-pass combination
LUBE OIL COOLER:	Unitized design non-drainback full flow cooling
FUEL FILTER:	One fuel filter providing 10 micron absolute filtration
STARTER:	12 volt
AIR COMPRESSOR:	Wabco 18.7 cfm compressor shall be provided.

Y\_\_\_ N\_\_\_

## **ENGINE COOLANT RADIATOR**

The engine coolant radiator shall have sufficient capacity to perform under the engine manufacturer installation requirements. The chassis manufacturer shall demonstrate the ability to meet this requirement with the submittal of an approved IQA to the fire department for the apparatus.

This radiator shall have HRPOS top and bottom tanks. These tanks shall have a material thickness of 11 gauge. The top and bottom tanks shall be attached to the header assemblies with a minimum of forty (40) fasteners. These fasteners shall not exceed a center distance of 1.938 inches to reduce the possibility of tank leaks. These fasteners shall be torqued to a value of 29.5 ft-lbs.

The header plates shall be made of 16 gauge brass.

The radiator tubes shall be constructed of .0066 inch thick brass and have a dimensional size of .076 inch x .625 inch. These radiator tubes shall have welded tube seams.

The radiator shall contain three (3) rows of tubes arranged in an inline profile across the radiator core. The entire radiator shall contain (231) tubes. These tubes shall have a smooth bore to allow for radiator cleaning.

In the critically stressed area, where the radiator tubes are attached to the header plates, this joint shall be accomplished with a welding process on the coolant side. In addition to the welded joint a solder fillet joint shall occur on the air side of the core creating a continuous dual bond.

The radiator shall have a louvered serpentine type core that contains fins constructed of .0024 inch thick copper. These fins shall be spaced to a maximum density of 14 fins per inch of radiator tube. Each fin shall have a louvered surface for high cooling efficiency.

The radiator shall contain an integral coolant de-aeration tank. This tank shall be designed to remove entrapped air or gas from the coolant side of the radiator.

The radiator side rails shall have integrally designed support gussets for the transition to the header attachment.

The bottom tank of the radiator shall have a drain valve for coolant removal.

The bottom tank of the radiator shall have a transmission cooler with a plate-type design. The plates shall have internal turbulators to break up laminar oil flow across the surface. The cooler shall have 1311 square inches of surface area for water surface contact and heat transfer.

The radiator system shall be pressurized with a cap rated per the cooling system requirements of the specific engine manufacturer.

The high efficiency engine fan shall be encompassed with a radiator shroud to provide the proper air flow from the fan blade to the radiator.

The perimeter of the radiator shall have recirculation baffles to eliminate the possibility of recirculation of "hot" air to the face of the radiator core. The bottom of the radiator shall have a recirculation baffle from the radiator to the frame rails.

Y\_\_\_\_ N\_\_\_\_

## **COOLANT RECOVERY SYSTEM**

A coolant recovery system shall be installed on the chassis. This tank is designed to capture coolant overflow when the engine coolant warms and expands. As the engine cools the overflow is then pulled out of the tank and back into the radiator, thus maintaining proper coolant levels.

Y\_\_\_\_ N\_\_\_\_

**CHARGE AIR COOLER RADIATOR**

The engine charge-air cooler shall have sufficient capacity to perform under the engine manufacturers installation requirements. The chassis manufacturer shall demonstrate the ability to meet this requirement with the submittal of an approved EPQ to the fire department for the apparatus.

This radiator shall have cast aluminum side tanks. These tanks shall have a material thickness of .200. These tanks shall be attached to the charge-air core with the ALBRAZE construction technique.

The external air fins shall be louvered serpentine and constructed of .006 inch thick aluminum.

The internal air fins shall be of the lance-and-offset design for greater air turbulence and higher efficiency. The internal fins are to be constructed of .010 inch thick aluminum.

The charge-air cooler shall be mounted directly in front of the engine coolant radiator. To reduce vibration rubber "iso" mounts shall be used for mounting of the charge-air cooler to the engine radiator.

The charge air cooler shall contain (12) rows of internal fins within a .313 x 2.632 aluminum tube assembly. This tube assembly shall be constructed of .025 thick aluminum.

The charge-air cooler shall contain thermal expansion slots to allow the expansion and contraction of the charge-air core over the wide range of temperatures that are expected in operation.

The charge air piping between the engine and charge-air cooler shall be aluminum tubing with a wall thickness of .065 inch. The system shall utilize four (4) ply silicone rubber woven Nomex hoses with stainless steel pressure bands. These bands are designed to maintain the hose shape under the pressure of the turbocharger boost air. All clamps used on the charge air piping are to be stainless steel constant torque and shall be installed at each joint.

Y\_\_\_\_ N\_\_\_\_

**COOLANT**

The coolant system shall contain an ethylene glycol and water mixture to keep the coolant from freezing to a temperature of -34 degrees F.

Y\_\_\_\_ N\_\_\_\_

**SILICONE COOLANT HOSES**

The entire chassis cooling system shall have silicone hoses. This shall include all hoses that come in contact with engine coolant.

Y\_\_\_\_ N\_\_\_\_

**COOLANT SYSTEM CLAMPS**

Constant torque, shielded, hose clamps shall be used for all cooling system hoses larger than 1/2 inch on the chassis.

Y\_\_\_\_ N\_\_\_\_

**HEATER LINE SHUT OFF VALVES**

The heater circuit shall have quarter turn shut off valves installed on both the supply and return lines to allow a complete shut off of coolant flow to the cab heaters in hot seasons of the year. These valves shall be installed in addition to the valves in the heater unit(s).

Y\_\_\_\_ N\_\_\_\_

**RADIATOR SKID PLATE**

To protect the radiator a 1/4 inch thick steel skid plate shall be installed under the radiator.

Y\_\_\_ N\_\_\_

**ENGINE AIR INTAKE FILTER**

The engine shall be equipped with a K&N heavy duty washable intake air filter. The filter shall utilize a media that does not require oil.

Y\_\_\_ N\_\_\_

**ENGINE OIL**

The engine shall have the initial factory fill made with a non-synthetic engine oil meeting the engine manufacturer's recommendations.

Y\_\_\_ N\_\_\_

**ENGINE BRAKE**

A "JACOBS" Engine Brake shall be supplied.

The driver's dash shall include an engine brake control switch.

Activation of the engine brake shall occur at zero throttle position. The transmission ECU shall be programmed to operate in the pre-select downshift mode to maximize the retarding power of the engine brake.

The brake lights shall illuminate when the Jacobs Brake is in operation.

The Jacobs brake shall be inoperative when the chassis is in pump mode.

The "JACOBS" engine brake shall be covered under the standard five year Cummins engine warranty.

Y\_\_\_ N\_\_\_

**ENGINE FAST (HIGH) IDLE**

The chassis shall be equipped with an Electronic Idle Control (EIC) for the electronic engine. Preset speed is factory adjustable.

The fast idle provision shall only function when the parking brake is set and the transmission is in neutral. Manual selection of the fast idle shall be controlled by a driver's momentary switch.

Automatic activation of the fast idle shall occur when a low voltage condition exists, the truck is in neutral and the parking brakes are applied.

Cancellation of the fast idle shall be achieved by resetting the manual switch or by depressing the service brake pedal.

Y\_\_\_ N\_\_\_

**CORROSION INHIBITOR**

Corrosion inhibitor shall be provided as an additive to the chassis cooling system.

Y\_\_\_ N\_\_\_

**AUXILIARY ENGINE COOLER**

The cooling system shall have one (1) SENDURE auxiliary engine cooler mounted in the upper radiator water pipe. The apparatus shall have the fire pump water circulated to the cooler from a valve located on the apparatus pump panel.

Y\_\_\_\_ N\_\_\_\_

### **SPARK ARRESTOR**

A spark arrestor shall be installed in the chassis air intake system. This arrestor shall be mounted behind the intake grille to filter out airborne embers.

Y\_\_\_\_ N\_\_\_\_

### **HORTON FAN**

A fan clutch shall be installed on the engine. A manual switch shall be provided in the dash, to override the fan control in event of fan failure or conditions that may result in overheating of the engine.

Y\_\_\_\_ N\_\_\_\_

### **EXHAUST SYSTEM**

A single exhaust pipe shall be provided for the engine. The exhaust pipe shall be supplied with a heat wrap. The wrap shall extend from the engine turbo charger to just below the frame rail.

The exhaust tubing from the turbocharger to the exhaust after treatment device shall be stainless steel.

Y\_\_\_\_ N\_\_\_\_

### **CUMMINS AFTERTREATMENT SYSTEM**

The chassis shall be equipped with a Cummins exhaust after treatment system in compliance with EPA 2010.

Y\_\_\_\_ N\_\_\_\_

### **TAILPIPE**

The tailpipe shall extend from the exhaust muffler/aftertreatment device to the rear of the vehicle making a 90° bend to exit the vehicle ahead of the rear tires on the curbside of the vehicle. The end of the pipe shall be cut square or perpendicular to the exhaust pipe centerline.

The pipe shall be unpolished stainless steel.

An exhaust gas diffuser shall be furnished on the end of the tailpipe.

Y\_\_\_\_ N\_\_\_\_

### **DIESEL EXHAUST FLUID SYSTEM**

The chassis shall be equipped with a 5 gallon Shaw Development Diesel Exhaust Fluid (DEF) reservoir system. The reservoir shall contain an Multifunctional Head Unit (MFHU) that contains integrated level and temperature sensors. The MFHU also shall contain a coolant powered heater to thaw DEF in conditions below 12°F (-11°C) to meet governmental regulations. The reservoir shall be located on the left frame rail behind the front axle beneath the cab. The mounting system shall use stainless steel mounting brackets to reduce the possibility of corrosion.

Y\_\_\_\_ N\_\_\_\_

### **TRANSMISSION**

The transmission shall be an Allison 4000EVS automatic transmission with electronic controls.

The transmission shall be equipped with a lock-up control circuit that shall automatically shift the transmission into 4th gear lock-up when the pump is shifted into gear.

Y\_\_\_\_ N\_\_\_\_

### **TRANSMISSION COOLER**

An automatic transmission cooler shall be provided as an integral part located in the bottom tank of the radiator. It shall be designed to withstand 165 psi working pressure and an intermittent pressure of 250 psi. The cooler shall be of sufficient size to maintain the operating temperature within the recommended limits of the transmission manufacturer.

Y\_\_\_\_ N\_\_\_\_

### **TRANSMISSION FLUID**

The transmission shall be provided with heavy-duty transmission fluid meeting Allison specification TES-389.

Y\_\_\_\_ N\_\_\_\_

### **FIVE SPEED PROGRAMMING**

The transmission shall be programmed for five speeds. The transmission shall have the following gear ratios.

First - 3.51  
Second - 1.91  
Third - 1.43  
Fourth - 1.00  
Fifth - 0.74  
Reverse - 4.80

The transmission shall be able to shift from first through fifth gear without operator intervention. The chassis shall be geared for the top speed in 5th gear.

Y\_\_\_\_ N\_\_\_\_

### **AUTOMATIC NEUTRAL**

The transmission shall be provided with circuitry to provide automatic neutral. Setting the parking brake commands the transmission to neutral when the park brake is applied, regardless of drive range requested on the shift selector.

After the transmission has been activated with the automatic neutral feature the shift lever must be returned to neutral and back to drive for midship pump operations.

Y\_\_\_\_ N\_\_\_\_

### **REMOTE FLUID LEVEL SENSING**

The chassis shall be equipped with an electronic low fluid level indicator system for the engine oil, transmission oil, engine coolant and power steering fluid as part of the instrumentation package. This system shall eliminate the need for daily checking of fluid levels with manual dipsticks.

Y\_\_\_\_ N\_\_\_\_

### **ENGINE COOLANT**

The coolant level sensor shall be located in the upper radiator reservoir. The corresponding LED indicator light shall be included in the display module.

Y\_\_\_\_ N\_\_\_\_

### **ENGINE OIL**

The engine oil sensor is in the engine oil sump. It shall monitor the oil level at approximately the 50% level. The corresponding LED indicator light shall be located to the right of the instrument panel on the doghouse in clear view of the driver.

Y\_\_\_ N\_\_\_

#### **POWER STEERING FLUID**

The power steering fluid sensor shall be located in the power steering fluid reservoir at the same level as the "Add" indicator on the dip stick. The corresponding LED indicator light shall be located to the right of the instrument panel on the doghouse in clear view of the driver.

Y\_\_\_ N\_\_\_

#### **FUNCTION**

The LED indicator lights shall illuminate when the ignition is placed in the ON position as a test to insure that the warning circuits are working. They shall go out when the starter button is pressed if normal fluid levels are detected. One or more of the lights staying shall indicate a low fluid level in the corresponding system(s). Any time the engine is ON and a low fluid level is detected, the appropriate light shall illuminate. The sensor output shall reset when the ignition is turned off.

Y\_\_\_ N\_\_\_

#### **TRANSMISSION OIL**

The transmission oil sensor shall be in the transmission oil sump. The fluid level indicator shall be integrated into the shift selector.

Y\_\_\_ N\_\_\_

#### **DRIVELINES**

Universal joints and driveshafts shall be SPICER 1810 series or equal. The driveshaft tube shall be a minimum of 4.5" diameter with a .259" tube wall thickness. The driveshaft slip joints shall be coated to reduce sliding friction and thrust under high torque loads. Permanent driveline installations shall be balanced to prevent vibration.

Y\_\_\_ N\_\_\_

#### **FUEL TANK**

The fuel tank shall have a capacity of 50 gallons (US) and be D.O.T. certified. It shall be mounted with straps bolted to the bottom frame flange to allow for easy removal. The tank construction shall be of 12 gauge steel with single fuel pickup and return tubes. The baffled tank shall be vented to prevent low vacuum and facilitate rapid filling.

The tank shall have a 2" NPT fill to the driver's side of the chassis.

The fuel tank sending unit is to be mounted to the driver's side of the fuel tank for easy replacement without removing body panels.

Y\_\_\_ N\_\_\_

#### **FUEL LINES**

Polyamide fiber, nylon braided, reinforced tubing with push-on reusable fittings shall be provided for the chassis fuel lines.

Y\_\_\_ N\_\_\_

#### **FUEL/WATER SEPARATOR**

The Cummins engine shall be equipped with an integrated fuel / water separator with a self-venting bottom drain valve. This filter shall be able to remove up to 95% of dissolved water and up to 99% of free standing water.

Y\_\_\_ N\_\_\_

## **ALTERNATOR**

A LEECE-NEVILLE model 4890JB, 320 amp alternator shall be installed on the engine. This alternator is internally rectified and regulated.

Y\_\_\_\_ N\_\_\_\_

## **FIRETRUCK CAB**

The apparatus shall be designed to operate in emergency conditions. These conditions require the apparatus to maneuver into areas at a high rate of speed. To facilitate in these operations a cab-over-engine design is required in order to reduce the overall length of the apparatus thus increasing the maneuverability.

The cab design must be such to provide safe and efficient transport of emergency personnel. The cabin shall be designed with four (4) side doors of the largest size possible and with a grab handle and step arrangement to provide ease of entry and egress.

There shall be up to six (6) positions available for occupant transport with a minimum of four (4) forward facing seating positions in the cab. The number of seats and seating locations are described in detail later in this document.

The apparatus cab shall be of the latest in automotive design, styling and appearance.

Y\_\_\_\_ N\_\_\_\_

## **CAB MATERIALS AND CONSTRUCTION**

The extruded aluminum cab shall have the following material gauges as a minimum:

- Cab floor - 3/16" (.190") aluminum
- Front skin - 3/16" (.190") aluminum
- Cab side panels - 3/16" (.190") aluminum
- Cab rear wall - 3/16" (.190") aluminum
- Cab driver's floor - 3/16" (.190") aluminum
- Cab officer's floor - 3/16" (.190") aluminum
- Cab crew area floor - 3/16" (.190") aluminum
- Cab roof - 3/16" (.190") aluminum
- Cab doors - 3/16" (.190") aluminum

*Roof Rail Section* Extending from the front to the rear of the cab above the doors the cab shall have an extruded aluminum section. This section shall be designed to interlock with the roof sheet and incorporate the door drip molding in one single piece.

*Upper Transverse Member* Amid ship in the cab there shall be a boxed beam header assembly located transverse in the cab from left to right.

*Front Door B-Post* This vertical box section of the cab located behind each of the front doors provides the slam post for the door latch assembly. This section also is a main member in the cab skeletal system. The B-Post ties into the Upper Transverse Member to provide torsional stiffness in the open space design of the cab.

*Rear Door B-Post* The box assembly design of the rear door B-post provides an anchor for the rear door latch assembly. This section is the main vertical support at the cab rear corner providing the anchor point for the rear wall structural lattice network.

*Roof Panel Rails* - The roof panel sub-assembly shall have extruded hat section supports bonded to the roof skin. These roof hat sections shall be joined to the Cab Roof Rail Section to complete the upper cab skeletal structure. These completed Roof Panel Rails shall provide a grid for maximum roof crush and deflection strength. The roof shall support a minimum weight of 250 lbs. / sq. ft. without permanent roof deformation.

*Rear Wall Rails* - The rear wall assembly shall have extruded hat section supports bonded to the wall skin. These sections shall be joined to the Roof Panel Rails and to the rear door slam post and floor provide a rear wall grid structure with maximum strength.

*Cab Front Wall* - The front wall of the cab shall be designed with a double wall construction to reduce the effects of exterior noise in the crew and operator compartment.

Y\_\_\_\_ N\_\_\_\_

## **CAB DIMENSIONS**

The cab shall have the following overall dimensional requirements:

- Overall Width - 100 inches
- Roof - 12" Raised - 49" wide notch in the raised roof section for aerials to bed
- Center of front axle to back of cab - 60 inches
- Center of front axle to front of cab - 74 inches
- Windshield area - 4,200 sq. in. minimum
- Front grille opening - 478 sq. in. minimum
- Combined side grille opening - 84 sq. in. each minimum
- Cab full tilt angle - 45 degrees minimum
- Cab full tilt height - 185 inches maximum

Cab interior dimensions shall be provided as a minimum in the following chart:

- Drivers side floor width 25-1/2 inches minimum
- Floor to the ceiling in the driver and officers area of the cab 59-1/2 inches minimum
- Floor to the top of the doghouse 28-1/2 inches maximum
- Officers side floor width 24-1/2 inches minimum
- The measurement across floor from rear wall to the first vertical portion of the engine enclosure 39 inches
- Floor to the ceiling in the rear of the cab 65-3/4 inches minimum

Y\_\_\_\_ N\_\_\_\_

## **CAB DOORS**

The cab entry and egress shall be designed for a firefighter in full turnout gear. Each door shall open a minimum of ninety degrees to afford the firefighter maximum space.

The doors shall be of a flush design each having exposed, one-piece, polished stainless steel hinges. The hinge shall be made of 12-gauge material with a minimum hinge pin diameter of 1/4 inch.

The door windows shall have interior and exterior glass weather seals to prevent the influx of exterior air.

The doors shall have exterior and interior paddle type latches for ease of opening with a gloved hand. The paddle latches are to have a rubber gasket, on the outside, separating the handle from the finished painted surface.

Y\_\_\_\_ N\_\_\_\_

## **FRONT DOORS**

The cab front doors shall be of the full-length design enclosing the entire step area of the cab. The door shall be a minimum of 38-1/2 inches wide and 74 inches tall. The front door windows shall have a minimum of 712 square inch area of viewing glass per door. There shall be a fixed piece of forward glass in each of the front doors.

Y\_\_\_\_ N\_\_\_\_

### **REAR CAB DOORS**

The rear cab doors shall be similar to the forward doors and shall be located directly behind the front wheel well area. These doors shall be 86 inches high x 34 inches wide. Each door shall have a roll down rear window with a minimum glass viewing area of 670 square inches.

Y\_\_\_\_ N\_\_\_\_

### **INTERIOR DOOR LOCKS**

All doors shall have door locks with interior controls and exterior keyed door locks. The installation shall be in conformance with FMVSS 206, with specific adherence to 49 CFR 571.206 Section 4.1.3 requiring that "Each door shall be equipped with a locking mechanism with an operating means in the interior of the vehicle". All doors shall be keyed alike. The doors shall be equipped with appropriate safety interlocks to prevent accidental locking of the doors when closed.

Y\_\_\_\_ N\_\_\_\_

### **DASH TRIM**

The drivers cab dash console shall be made of black ABS with an appearance of the latest in automotive design, styling. Accompanying the dash console in the forward section of the cab shall be an officers side flat dash for the mounting of a mobile data terminal.

The forward overhead console area shall have an automotive styled black ABS covering. This console shall be provided with a center overhead area to house sirens, officer's side speedometer, AM/FM radio and an information center. The console shall have depressed areas for styling with the installation of items such as the visors, electrical access

Y\_\_\_\_ N\_\_\_\_

### **CAB GLASS**

AS-1 safety laminate glass shall be used in a two piece, wrap around design with a minimum 3760 square inches of windshield area for maximum visibility. The windshield shall have the style of a one-piece assembly with the practical installation of two pieces for lower replacement cost. The windshield shall be readily available from a nationally recognized automotive glass manufacturer that maintains local distribution outlets.

All glass shall be tinted.

All fixed glass shall be installed with a one-piece triple locked rubber lacing material. Due to long term appearance two-piece chrome trim lock lacing is not desired.

Y\_\_\_\_ N\_\_\_\_

### **SUNVISORS**

The driver and officer side of the cab shall be equipped with a sun visor. The vinyl covered visors shall be a minimum of 17-1/2" by 9".

Y\_\_\_\_ N\_\_\_\_

### **DRIVER SIDE ELECTRICAL CABINET**

Beneath the drivers seat there shall be an electrical cabinet designed to house the main battery electrical disconnect and facilitate the installation of an onboard battery charger or battery conditioner. A bolt on limited access; aluminum diamond

plate hatch shall be installed on the front side of the seat box. The access hatch shall have a louvered section to provide air circulation to the cabinet. This cabinet shall not be used for casual storage.

Y\_\_\_ N\_\_\_

### **WINDSHIELD WIPERS**

Two speed electric pantograph wipers shall be installed. These wipers shall have minimum 24" blades and have 28 1/2" wet arm electric pump washers. A 70 oz. Minimum windshield washer reservoir shall be furnished.

Y\_\_\_ N\_\_\_

### **FASTENERS**

All cab exterior fasteners shall be stainless steel type fastened to the cab with nutserts.

Y\_\_\_ N\_\_\_

### **BATTERY ACCESS**

The rear cab steps shall have a removable kick panel, providing access to the batteries for routine maintenance and inspection.

Y\_\_\_ N\_\_\_

### **CAB CORROSION TREATMENT**

The cab shall have a corrosion preventative material conforming to Mil Spec C-16173-C, Grade 1, applied during and after construction. A 10-year warranty against perforation due to rust or corrosion shall be furnished for the cab.

Y\_\_\_ N\_\_\_

### **TRANSMISSION SELECTOR**

The transmission shall be controlled by a push button type shift control. It shall be internally illuminated for night operation.

Y\_\_\_ N\_\_\_

### **TRANSMISSION OIL LEVEL SENSOR**

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

Y\_\_\_ N\_\_\_

### **EMI/RFI PROTECTION**

The apparatus shall incorporate the latest designs in the electrical system with state of the art components to insure that radiated and conducted electromagnetic interference (EMI) and radio frequency interference (RFI) emissions are suppressed at the source.

The apparatus proposed shall have the ability to operate in the environment typically found in fire ground operations with no adverse effects from EMI/RFI.

EMI/RFI susceptibility is controlled by utilizing components that are fully protected and wiring that utilizes shielding and loop back grounds where required. The apparatus shall be bonded through wire braided ground straps. Relays and solenoids that are suspect to generating spurious electromagnetic radiation are diode protected to prevent transient voltage spikes.

In order to fully prevent the radio frequency interference the purchaser shall be requested to provide a listing of the type, power output, and frequencies of all radio and bio medical equipment that is proposed to be used on the apparatus.

Y\_\_\_\_ N\_\_\_\_

**BATTERY BOX TRAY - STAINLESS STEEL**

The battery box trays shall be stainless steel to reduce the corrosive potential of the tray. The battery hold down and brackets and hardware shall also be made of stainless steel.

Y\_\_\_\_ N\_\_\_\_

**BATTERY BANK**

A single battery system shall be provided, utilizing four (4) high cycle type Group 31 batteries.

This system shall be capable of engine start after sustaining a continuous 150 amp load for 10 minutes with the engine off (NFPA-1901).

A battery disconnect switch (Rated at not less than 450 amps continuous) shall be used to activate the system and provide power to the power panel. A green pilot light shall illuminate to indicate that the1 battery bank is activated.

Y\_\_\_\_ N\_\_\_\_

**BATTERY CABLES**

All battery wiring shall be "GXL" battery cable capable of handling 125% of the actual load. It shall be run through a heat resistant flexible nylon "HTZL" loom rated at a minimum of 300 degrees Fahrenheit. All cable connections shall be machine crimped and soldered.

Y\_\_\_\_ N\_\_\_\_

**STARTING CIRCUIT**

One (1) engine start button is to be located on the lower right dash panel. It shall be wired to heavy duty solenoid rated at not less than 1100 amps. The battery indicator light is to be located directly above the start button to indicate that the battery bank is on.

Y\_\_\_\_ N\_\_\_\_

**ON-BOARD ELECTRICAL AIR COMPRESSOR PUMP PLUS CHARGER**

A KUSSMAUL AUTO AIR model 091-9-1200 air compressor with a 40 amp automatic battery charger shall be supplied on the chassis. A pressure switch shall sense when the system pressure drops and start the compressor which then runs until pressure is restored. All ball bearing construction, lubricated for life, assures reliable operation and requires no servicing. Compressor Output: 0.30 CFM@80 PSI; 0.35 CFM@60 PSI. Pressure Switch: Adjustable Set Point-Factory set to 75 PSI Cut-in, 95 PSI Cut-out.

The Pump Plus 1200 charger shall sense the batteries in the vehicle and recharge them exactly as much as required. When the batteries are fully charged, all charging shall stop. The state of charge of the batteries shall be indicated on a

remotely located bar graph display whenever power is applied to the vehicle.

A selector switch shall be provided on the charger to operate the compressor either as a D.C. compressor or as an A.C. compressor. In either switch position the compressor shall operate from the vehicle's battery. When "D.C." is selected, the compressor operates whenever the pressure switch senses low system pressure.

The compressor shall be located in the officer's side front step well with a bolt on style access panel. As installed in the chassis the compressor power selector switch will be placed in the A.C. position.

The remote charge indicator shall be located on the driver's seat box adjacent to the master battery switch.

Y\_\_\_\_ N\_\_\_\_

### **SHORELINE AUTO-EJECT**

A KUSSMAUL Super Auto Eject, model 091-55-20-120, with weatherproof cover shall be provided.

The Super Auto Eject shall be used to completely seal and prevent internal contamination of the working components.

The internal switch arrangement of the Super Auto Eject shall be designed to close and open the 120-volt AC circuit after the mating connector is inserted and before the connector is removed. This design shall prevent arcing at the connector contacts to provide long life.

The electrical connection shall be provided as a 120-volt AC - 20 amp type using a NEMA 5-20P connector.

The Auto-Eject cover shall be a Kussmaul 091-55YW, yellow in color.

The Auto Eject assembly shall be mounted on the exterior of the cab behind the driver's door.

Y\_\_\_\_ N\_\_\_\_

### **BATTERY JUMPER STUDS**

Battery jumper studs shall be provided on the chassis. The jumper studs shall be mounted underneath the cab, on the rear of the driver's side battery box. The studs shall be connected to the chassis batteries with 1/0 color coded cables, red for the positive cable and black for the negative cable. The studs shall be protected with color coded plastic covers when not being used.

Y\_\_\_\_ N\_\_\_\_

### **ENGINE DOGHOUSE**

The engine doghouse inside the cab shall be padded with a layer of sound and heat absorbing foam and covered with heavy duty vinyl trim upholstery to match or accent the interior of the cab.

The underside of the engine enclosure shall be covered with a sandwiched material for interior cab noise and heat rejection. This sandwiched acoustical material shall have one layer of 1/8" foam, a 3/16" single barrier septum and a 7/8" layer of foam to provide an overall thickness of 1-3/16". The sandwich material shall be chemically bonded to prevent layer separation. A finished surface treatment of metalized film shall be provided on the engine side of the barrier. The acoustical barrier shall be held in place with mechanical fasteners in addition to adhesive.

The insulation for protection from heat and sound shall keep the dBa level within the limits stated in the current edition of NFPA 1901.

Y\_\_\_\_ N\_\_\_\_

**CAB DOORS - INTERIOR TRIM**

To provide durability and a reflective surface for night operations the interior of the cab doors shall be finished with full length brushed stainless steel panels

Y\_\_\_ N\_\_\_

**INTERIOR CEILING PADDING AND TRIM**

The cab front interior ceiling shall have a one-piece, removable, vinyl headliner to cover all wiring and tubing used for lights and antenna leads.

Y\_\_\_ N\_\_\_

**REAR WALL COVERING**

The rear interior wall of the cab shall have a two-piece, removable, wall covering to finish the interior trim, cover all wiring and tubing used for lights and antenna leads.

Y\_\_\_ N\_\_\_

**FLOOR COVERING**

The front and rear floor areas of the cab shall be covered with "HUSHCLOTH" sound barrier floormats. This floormat shall be a three ply material with a 3/16" thick open cell isolation barrier of Polyurethane, a 3/32" thick closed cell Nitrile mid barrier for section reinforcement, and a 1/16" thick embedded pebbled grain wear surface.

Y\_\_\_ N\_\_\_

**CHEVRON - INTERIOR CAB DOOR**

A red and white chevron reflective striping design shall be installed on each cab door for a total of four (4). The chevron shall be centered on the door kick plate and shall be visible when the cab door is open to traffic.

Y\_\_\_ N\_\_\_

**LED WARNING LIGHTS - CAB DOOR FOSTER LIGHT**

The interior of each door shall include one (1) 16 inch long X 3/4 inch tall amber Weldon LED warning light. The light shall be mounted on the inside of the door above the door window to the extreme outboard edge of the door so it is visible from the rear of the vehicle. As a traffic warning indicator the light shall activate with a scrolling directional flash pattern which moves from the door hinge area outward when the door when it is in the open position.

Y\_\_\_ N\_\_\_

**INTERIOR CAB STEP TRIM**

The cab steps shall be completely enclosed behind each door. The toe kick surface shall be covered with aluminum treadplate trim.

Y\_\_\_ N\_\_\_

**STEERING WHEEL AND COLUMN**

The steering column shall be a DOUGLAS tilt / telescopic type with an integral high beam / turn signal control switch. The column shall have self-canceling design for the turn signal switch. A 4-way warning "Hazard" light switch shall be mounted on the column. For safety, a rubber boot shall be installed to cover the steering shaft from the dash to the floor.

The steering wheel shall be a VIP, 18-inch diameter wood accent-leather wrapped 4-spoke wheel. A lever on the left side of the steering column shall control the telescopic feature.

Y\_\_\_\_ N\_\_\_\_

**GRAB HANDLES**

One (1) additional molded grab handle shall be installed inside the cab. The handle shall be located on the officer's side on the A Post.

Two (2) additional molded grab handles shall be installed in the cab. These handles shall be located one each side on the B Posts side of the crew area doors.

Y\_\_\_\_ N\_\_\_\_

**RADIO COMPARTMENT WITH DOOR**

Beneath the officer's seat there shall be a radio compartment with interior dimensions of 19-1/2" wide x 17" long x 7" high. This compartment shall have a side mounted diamond plate door mounted on a piano hinge. The compartment shall have a power and ground wires roughed in for radio install. This circuit must be able to support 30 AMP draw. This circuit will be controlled at the master switch and have a 30 AMP circuit breaker installed as near master switch as possible.

Y\_\_\_\_ N\_\_\_\_

**CAB STEP DIMENSIONS**

The front cab steps shall have the following overall dimensional requirements:

- Driver's lower step size 10-1/4 inches deep minimum
- Driver's lower step size 29-1/2 inches front to back
- Officer's lower step size 10-1/4 inches deep minimum
- Officer's lower step size 29-1/2 inches front to back

Y\_\_\_\_ N\_\_\_\_

**INTERMEDIATE CAB STEP**

The cab shall have a full width intermediate "LaserGrip" anti-slip inside step. The intermediate step shall be approximately 9 inches from the top of the lower step to the top of the intermediate step.

Y\_\_\_\_ N\_\_\_\_

**INTERIOR CAB STEP TRIM**

The cab steps shall be completely enclosed behind each door. No portion of the cab entrance step shall be exposed when the door is in the closed position. The lower step shall be sealed from the underside of the cab to eliminate road splash from entering the step area while the vehicle is driving. The horizontal step surfaces shall be covered with bright aluminum tread plate meeting the requirements of NFPA-1901.

The vertical toe kick surface area of the cab step wells shall be covered with aluminum tread plate.

Y\_\_\_\_ N\_\_\_\_

### **REAR SEAT FOOT REST**

A "LaserGrip" foot rest shall be provided in the crew area for the outboard rear facing seats. The foot rest shall provide an additional flat surface in the wheel well area.

Y\_\_\_\_ N\_\_\_\_

### **COMPARTMENT OPEN LIGHT**

A Red Open Compartment Flashing Light, Whelen OS Series LED shall be mounted on the driver's side face of the overhead panel. A chrome flange is to be supplied with the light.

This light is wired with a flasher to the power panel for completion to circuit on the body.

The light circuit shall be wired so that the light circuit is deactivated when the parking brakes of the apparatus are applied.

A label shall be applied adjacent to the light '**DOOR OPEN**'.

Y\_\_\_\_ N\_\_\_\_

### **CAB FLOOR STEP LIGHTING**

The floor of the cab shall be trimmed with a ribbed aluminum extrusion. The extrusion shall protrude as a approximately 3/4" over the floor area to provide a mounting channel and guard for an LED integrated light. The LED lighting shall illuminate the step area of the cab and all step lights shall be illuminated when any door is opened and the battery selector switch is in the on position.

Y\_\_\_\_ N\_\_\_\_

### **DRIVER & OFFICER AREA WHITE LED CAB LIGHTING**

There shall be a white LED strip lighting mounted above the full length of each front door in the cab. The strip light shall be mounted in an aluminum extrusion and shall face the center of the cab.

The lighting shall be operated opening a cab door.

Y\_\_\_\_ N\_\_\_\_

### **OFFICER AREA RED LED CAB LIGHTING**

There shall be a red LED strip lighting mounted above the full length of the officer's cab front door in the cab. The strip light shall be mounted in an aluminum extrusion and shall face the center of the cab.

The lighting shall be operated by a switch in the driver's area.

Y\_\_\_\_ N\_\_\_\_

### **CREW AREA WHITE LED CAB LIGHTING**

There shall be a white LED strip lighting mounted above the full length of each cab crew door in the cab. The strip light shall be mounted in an aluminum extrusion and shall face the center of the cab.

The lighting shall be operated opening a cab door.

Y\_\_\_\_ N\_\_\_\_

**CREW AREA RED LED CAB LIGHTING**

There shall be a red LED strip lighting mounted above the full length of each cab crew door in the cab. The strip light shall be mounted in an aluminum extrusion and shall face the center of the cab.

The lighting shall be operated by a switch in the driver's area.

Y\_\_\_\_ N\_\_\_\_

**CAB HEATER / DEFROSTER**

A cab climate control system shall be installed beneath the dash on the officers side of the cab. This unit shall include a three-speed blower, temperature control valve and a 44,000 BTU heater core.

The heater control shall be located on the doghouse mounted control center. The control shall have separate on-off blower speed switch, thermostat control and outlet blend air switch.

There shall be one heat outlet with directional and flow control provided on the driver and one on the officer side of the control center.

There shall be one under dash floor directed heat outlet provided on the driver's side and one on the officer's side of the cab.

There shall be two floor heater outlets, one located on each side of the cab beneath the dash.

There shall be a Max Flow defrost system installed into the front of the cab. The ducting of the Max Flow system shall direct heated air onto the windshield to provide defrost and defog capability.

Y\_\_\_\_ N\_\_\_\_

**45,000 BTU AIR CONDITIONING SPLIT CONDENSER**

A climate control system shall be furnished in the cab. The system shall consist of a 45,000 BTU air conditioning evaporator centrally located on the rear of the engine doghouse.

The system is to have a 12.6 cu. in. minimum compressor mounted on the engine to provide the compressed refrigerant to the system. The compressor is to be plumbed to two (2) heavy duty truck, single fan air conditioning condensers mounted on the cab roof one each side of the boom notch. The condensing units shall have a protective shroud that is painted to match the color of the cab roof. There shall be an extended life filter receiver/dryer with a pressure relief valve installed to protect the system from contaminates, moisture, and high pressure. It is to have a sight glass for visual inspection and ease of service.

The evaporator shall have an externally equalized expansion valve and be thermostatically protected to prevent freeze up. Dual high performance 3-speed blowers shall provide a minimum of 700 CFM air flow. Each blower is to be controlled separately. Four (4) forward facing and three (3) rear facing full adjustable diffusers with shutoff capability shall be utilized to direct the air flow through the cab.

The air conditioning on off switch, thermostat control, and blower switches shall be located on the evaporator unit.

The air conditioning system shall use R134A refrigerant.

Y\_\_\_\_ N\_\_\_\_

### **36,000 BTU SUPPLEMENTAL HEATER**

A 36,000 BTU auxiliary heater shall be furnished inside the conditioning evaporator unit to provide additional cab heating during cooler weather. The heater core is to be plumbed to the water lines of the engine cooling system.

Y\_\_\_ N\_\_\_

### **CAB INSULATION**

Foam rubber type insulation shall be installed in the rear wall and the cab ceiling to provide a better sound and heat barrier. The insulation shall be a minimum of 1" thick. The material shall be compliant with FMVSS-302.

Y\_\_\_ N\_\_\_

### **DRIVER INSTRUMENTATION AND CONTROLS**

The gauges shall have red LED back lighting for enhanced visibility. Upon initial ignition sequence, a lamp check function shall illuminate the warning light telltales, the self-diagnostic message center shall sequence the warning light telltales if data link communications are lost. The instrument panel shall include the following gauges and indicators.

- Electronic speedometer with LCD odometer
- Tri cluster gauge that includes:
  - Electronic tachometer
  - Engine coolant temperature gauge, with warning light and buzzer
  - Engine oil pressure gauge, with warning light and buzzer
- Transmission fluid temperature gauge, with warning light and buzzer
- Two air pressure gauges, with warning light and buzzer
- Voltmeter, with low voltage warning light and buzzer
- Fuel level gauge
- High beam indicator light
- Parking brake set light
- Turn signal indicator lights

The lighting control panel is to be located to the left side of the instrument panel. The lighting control panel shall include the following:

- Headlight control switch
- Dash rheostat for instrumentation lighting control
- Wiper and washer control switches

The engine control panel is to be located beneath the instrument panel on the driver's right hand side. The engine control panel shall include the following:

- Keyless ignition switch with a green pilot light

The apparatus control panel is to be located beneath the instrument panel on the driver's left hand side. The apparatus control panel shall be designed for the location of pump shift controls.

Y\_\_\_ N\_\_\_

### **AUDIBLE TURN SIGNAL REMINDER**

There shall be an audible alarm that shall sound when the turn signal remains flashing for a distance greater than one mile. The reminder shall not sound when the hazard lights are operating.

Y\_\_\_ N\_\_\_

**AUDIBLE LIGHTS ON REMINDER**

There shall be an audible alarm that shall sound when the headlight switch is left in the on position and the ignition is off. The alarm shall self-cancel after 2 minutes of operation.

Y\_\_\_ N\_\_\_

**AUDIBLE PARKING BRAKE REMINDER**

There shall be an audible alarm that shall sound when the parking brakes are NOT set and the ignition is turned off. This alarm shall self-cancel after 2 minutes.

The Parking Brake reminder shall sound an audible alarm when the parking brakes are set and an indicated speed of over two miles per hour occurs.

Y\_\_\_ N\_\_\_

**DUAL TRIP ODMETERS**

There shall be two (2) trip odometers in the driver's information center. Each shall be capable of independent operation and reset. They shall be labeled Trip1 and Trip2 when the trip mileage is shown in the LCD panel.

Y\_\_\_ N\_\_\_

**SPEEDOMETER ACTIVATED IN PUMP MODE**

The speedometer and odometer shall be activated while in pumping mode.

Y\_\_\_ N\_\_\_

**LOW FUEL LIGHT**

A "Low Fuel" warning light and alarm shall be installed in the dash message center. This light shall illuminate when the apparatus fuel level reaches 25% of the fuel remaining.

Y\_\_\_ N\_\_\_

**TRANSMISSION OVERHEAT WARNING LIGHT**

A transmission oil temperature light with alarm shall be provided on the dash message center.

Y\_\_\_ N\_\_\_

**LOW VOLTAGE WARNING**

A low voltage indicator light shall be installed on the dash message center. An alarm and the dash indicator light shall activate when the system voltage drops below 11.8 volts.

Y\_\_\_ N\_\_\_

**AIR CLEANER RESTRICTION INDICATOR**

An air cleaner restriction indicator shall be installed in the driver's message center. The indicator shall provide visual warning when a high air restriction condition exists for a minimum of 4 seconds.

Y\_\_\_ N\_\_\_

**LOW COOLANT WARNING**

Low coolant warning shall be accomplished through the engine electronics to provide driver warning via the engine stop warning light.

Y\_\_\_ N\_\_\_

**INTERMITTENT WIPER CONTROL**

A rotary combination intermittent electric wiper / washer switch shall be provided on the left hand side of the driver's dash.

Y\_\_\_ N\_\_\_

**CONTROL CENTER**

Mounted on the doghouse there shall be a black ABS driver / officer control center. This area shall include various controls and functions that must be available to the driver and officer. On the top of the control center there shall be an access panel for maintenance and troubleshooting of devices mounted on the control center.

The apparatus warning light switch panel shall be mounted on the control center immediately to right of the driver.

Y\_\_\_ N\_\_\_

**SWITCH PANEL**

The switch panel shall be a Class 1 Smart Programmable Switch (SPS) panel installed as a multiplexed node to provide input and output information to the apparatus electrical system. The panel shall have ergonomic rubber molded rocker type switches with backlighting.

The panel shall include one (1) function as a master control switch to allow for preselection of response mode functions. The remaining switches shall be programmed and labeled with the manufacturer standards as to the custom options selected for the vehicle.

Y\_\_\_ N\_\_\_

**PARKING BRAKE CONTROL VALVE**

The apparatus parking brake control valve shall be located on the doghouse mounted control center.

Y\_\_\_ N\_\_\_

**DUAL PORT USB CHARGING PORT**

A Kussmaul 3 amp Dual USB charging port shall be installed in the center console to the right of the parking brake. The charging port shall have a built-in LED indicator to show that the device is powered.

The USB charging port shall be powered with the battery power switch in the cab.

Y\_\_\_ N\_\_\_

**CUP HOLDERS**

There shall be two (2) recess mounted cup holders mounted on top of the doghouse console.

Y\_\_\_ N\_\_\_

## **MULTIPLEXED ELECTRICAL SYSTEM**

The apparatus shall be equipped with a *Class 1* ES-Key Management System for complete control of the electrical system devices. This management system shall be capable of performing load management functions, system monitoring and reporting, and be fully programmable for control of the electrical system.

The ES-Key system shall utilize a Controller Area Network (CAN) to provide multiplexed control signals for "real time" operation. The system shall consist of the following components:

- *Universal System Manager (USM)* - The USM device shall be the CAN network controller and provide various functions to the apparatus such as load management. The USM shall be programmed from a network interface to a PC computer.
- *Power Distribution Module(s) (PDM)* - The PDM shall be a control device on the network with a primary function as power distribution. Receiving control signals from the USM the PDM turns on and off relays providing power to its connected loads. The PDM also shall contain digital switch inputs allowing for input clustering throughout the apparatus.
- *Information Display Module* - For displaying text, warnings and diagnostics. The information Display Module shall allow the fire department to access and change load management shedding priority and maintenance text listing the routine maintenance items and lubrication capacities on the apparatus.
- *Input / Output Module* - The module shall have 16 inputs to communicate with the USM and 3 outputs for various chassis functions.

The ES-Key system shall provide diagnostic capabilities for troubleshooting the electrical system of the apparatus.

Y\_\_\_\_ N\_\_\_\_

## **CHASSIS COLOR CODED WIRING**

All chassis wiring shall be type "GXL" in accordance with S.A.E. J1128 and NFPA-1901. ALL wiring shall be **COLOR CODED** and continuously marked with the circuit number and function.

All wiring to be covered in nylon heat resistant "HTZL" loom rated at a minimum of 300 degrees F exceeding the heat requirements of NFPA-1901.

A battery "loop back" ground circuit shall be supplied for the EDS system to reduce the possible effects of Electromagnetic and Radio Frequency Interference.

The chassis cab, engine and transmission shall be electrically bonded to the chassis frame rails with braided ground straps.

Y\_\_\_\_ N\_\_\_\_

## **ELECTRICAL SYSTEM CONNECTORS**

All multiple conductor electrical connections shall be made with Packard electrical connectors. The Packard connectors shall become mechanically locked when mated.

All single wire terminations requiring special connectors with a ring or spade terminal shall be crimped, and wrapped with heat shrink tubing.

Y\_\_\_\_ N\_\_\_\_

**INFORMATION DISPLAY MODULE**

The Information Display Module for displaying text, warnings and diagnostics shall allow the fire department to access and change load management shedding priority and maintenance text listing the routine maintenance items and lubrication capacities on the apparatus.

Y\_\_\_\_ N\_\_\_\_

**BACK-UP CAMERA / GPS**

There shall be supplied a Garmin NUVI 2798LMT combination back up camera and GPS. The seven (7) inch monitor screen shall be mounted onto the cab console utilizing a RAM mounting system with the ability to have 360° adjustment without the use of tools. The GPS functionality of the unit shall be provided with lifetime Map updates. The camera shall be mounted recessed in the rear bumper.

Y\_\_\_\_ N\_\_\_\_

**12VDC TRIPLE POWER POINT**

A triple outlet 12 volt, socket (cigarette lighter) type, receptacle shall be provided.

The power point shall be wired to switched battery power with the appropriate wire size and fuse.

The power point socket shall be provided, centered on the front area of the engine doghouse for use by the driver and/or officer.

Y\_\_\_\_ N\_\_\_\_

**12VDC POWER CIRCUIT**

A circuit breaker protected 30 amp battery "hot" circuit, circuit breaker protected 30 amp battery switched circuit, and ground circuit with the proper wire size to handle the current shall be provided. This circuit is provided for two-way radio and/or accessory wiring.

The radio / accessory power circuits shall terminate in the power panel area of the cab

Y\_\_\_\_ N\_\_\_\_

**RADIO ANTENNA MOUNT WIRING**

Two (2) NMO antenna mounts shall be roof mounted, one on the officer's side of the cab, one on the driver's side of the cab.

The antenna mounts shall be located in a forward position on the cab that will not interfere with lights or other roof mounted equipment.

The unterminated coax is to be routed in the cab to the radio power circuit termination in officer's and driver's seat box(es).

Y\_\_\_\_ N\_\_\_\_

**PUBLIC BROADCAST RADIO**

The cab shall be equipped with an AM/FM Stereo Radio with CD Player and four ceiling mount recessed speakers.

Y\_\_\_\_ N\_\_\_\_

### **ROAD SAFETY KIT**

One (1) 2-1/2# ABC DOT Approved fire extinguisher shall be provided. The fire extinguisher shall be shipped loose with the chassis.

One (1) set of DOT approved hazard triangles shall be supplied with the chassis. They shall be stored in a plastic case and shipped loose with the chassis.

Y\_\_\_\_ N\_\_\_\_

### **CAB CRASHWORTHINESS TEST**

Dynamic tests shall be performed to evaluate the crashworthiness of the proposed vehicle cab configuration to the requirements of NFPA 1901.

Cab roof strength shall be tested utilizing the dynamic preload criteria from SAE J24221 paragraph 5 specifications and procedures.

Front impact strength integrity shall be tested utilizing SAE J24202 with ECE R293 Annex 3 paragraph 4 equivalent energy.

Quasi-static roof strength shall be based on SAE J2422 paragraph 6 and ECE R293, paragraph 5 specifications and procedures.

A letter of certification shall be provided upon request by the department.

Y\_\_\_\_ N\_\_\_\_

### **EXTERIOR GRAB HANDLES**

The cab shall have a bright anodized extruded aluminum 24" grab handles at each door position. The aluminum shall be bright anodized for long service. Molded rubber gaskets shall be installed under the grab handles to protect the painted surface of the cab.

Y\_\_\_\_ N\_\_\_\_

### **RED WARNING LIGHT, CAB HANDRAILS**

The rear door cab handrails shall contain red integrated LED lighting. The lighting shall be integrated into the grab bar, directed toward the rear of the apparatus. The LED lights shall flash with the emergency warning lights.

Y\_\_\_\_ N\_\_\_\_

### **AMBER SIDE TURN SIGNAL, CAB HANDRAILS**

The front door cab handrails shall contain amber integrated LED lighting. The lighting shall be integrated into the grab bar, directed toward the rear of the apparatus. The LED lights shall flash with the directional signals.

Y\_\_\_\_ N\_\_\_\_

**CAB GRILLES**

A three dimensional silver finished stylized front grille shall be installed on the front cab face. The front grille shall have a radiator rock guard to assist in preventing damage to the radiator core.

The cab shall have one (1) engine "hot" air exhaust and one (1) engine air cleaner intake, on each side of the cab. These openings shall be covered with a honey comb wire screen and shall have a bright polished stainless steel outer grille.

Y\_\_\_\_ N\_\_\_\_

**HEADLIGHT TRIM**

The cab shall be supplied with a stylized silver finished headlight trim. The band shall encompass the headlight housings and directional signals on each side of the cab grille and continue toward the front door hinge.

Y\_\_\_\_ N\_\_\_\_

**CAB MUDFLAPS**

Mud flaps shall be installed behind the front tires. These mud flaps shall be a minimum of 22" wide to protect the underneath of the cab and body.

Y\_\_\_\_ N\_\_\_\_

**CAB GROUND LIGHTING - LED**

One (1) LED, Armor Protected strip light shall be mounted beneath each door. These lights shall be designed to provide illumination on areas under the driver and crew riding area exits. All cab ground lights shall be switchable and shall automatically activate when any cab exit door is opened.

Y\_\_\_\_ N\_\_\_\_

**MIRRORS**

MOTO-MIRROR 16 1/2" X 7" stainless steel heated, remote control mirror heads shall be mounted on spring loaded retractable mirror arms. Includes a 5-1/2" x 8.5" convex mirror head.

Y\_\_\_\_ N\_\_\_\_

**FRAMELESS FIXED CAB SIDE WINDOWS**

Two (2) AS-2 tempered glass, fixed side windows, 26-1/2" high x 16" wide shall be furnished, one on each side behind the forward doors. All glass shall be .180-.190 grey tinted. These windows shall be a frameless design installed without window lacing.

Y\_\_\_\_ N\_\_\_\_

**ELECTRIC WINDOWS**

The four (4) roll down door windows shall be equipped with electrically operated mechanisms to control the opening and closing of the windows. Control shall be with a momentary switch in the door.

Three (3) additional switches shall be supplied in the driver's door to control all four of the power windows from the driver's position.

Y\_\_\_\_ N\_\_\_\_

**REAR WINDOW SAFETY BARS**

There shall be a one inch stainless steel grab bar installed on each rear door. This bar is to be installed on the rear door frame even with the window in the down position to prevent firefighters from using the glass in the door for a handle.

Y\_\_\_\_ N\_\_\_\_

**WINDOW TINTING**

The crew door windows shall have GRAYLITE II tint (9% visible) to provide privacy and to assist in reducing the amount of heating inside the cab due to direct sunlight and unwanted glare.

Y\_\_\_\_ N\_\_\_\_

**UNDER CAB ENGINE MAINTENANCE LIGHTS**

Two (2) engine maintenance lights shall be supplied beneath the cab. These lights shall illuminate automatically when the cab is tilted to the full tilt position.

Y\_\_\_\_ N\_\_\_\_

**SIDE STAINLESS STEEL TRIM**

The finished cab shall be supplied with a side mounted polished stainless steel trim band. The bottom edge of the trim band shall line up with the bottom edge of the cab. This band shall be 2 inches in height and shall run from the front door hinges to the rear of the cab on each side.

Y\_\_\_\_ N\_\_\_\_

**WHEEL WELL LINERS**

To reduce road splash and allow for easy cleaning, bolt in front wheel well liners are to be installed. Stainless steel material is to be used for the liner for ease of cleaning and eliminate corrosive action created by road debris. The wheel well liners are to be a minimum of 22 inches in width.

Y\_\_\_\_ N\_\_\_\_

**STAINLESS CAB FENDERETTES**

To reduce road splash on the cab sides, polished stainless steel fenderettes shall be installed around each the wheel opening.

Y\_\_\_\_ N\_\_\_\_

**EXTERIOR REAR WALL DIAMOND PLATE OVERLAY**

The cab exterior rear wall shall be covered with a single sheet of bright aluminum tread plate to protect the back of the cab from scratches.

Y\_\_\_\_ N\_\_\_\_

**CAB TILT SYSTEM**

The cab shall tilt a minimum of 45 degrees for ease of serving. Tilting shall be accomplished by means of a tilt pump

connected to two (2) heavy duty lift cylinders. It shall be equipped with a positive locking mechanism (service lock) to hold the cab in the full tilt position. Release of the service lock shall be by means of a pull type cable assembly. The cylinders shall have a velocity fuse at the base to prevent the cab from falling in the event of a hydraulic hose failure. The cab shall be capable of tilting 90 degrees for major engine service, if necessary. The 90 degree cab tilt shall be accomplished by removing the cab cylinder pins, removing one bolt in the steering shaft, and removing the front bumper and treadplate.

The cab shall have a three (3) point cab locking system. To prevent undue stresses in the cab, the cab mounting shall incorporate a five (5) point load mounting system.

The front cab pivot/lock assemblies shall utilize four (4) radially loaded, bonded rubber, axial mounts. These mounts shall have a maximum radial load rating of 925 pounds each and a torsional rating of 25 lbs-in/deg. Two one (1) inch diameter cab pivot pins shall be installed at the front of the cab.

The rear cab lock shall be center point mounted to prevent normal twist of the chassis from affecting the cab mounting, cab structure and windshield areas of the cab. This rear cab lock shall be mounted on a chassis crossmember to provide a stable platform for the locking system. The cab lock shall be mounted to a baseplate that is fastened to rubber isolators to reduce road noise and provide additional movement of the cab lock. This locking system shall automatically open prior to the cab tilting and automatically relatch when the cab is lowered completely into the travel position.

Two (2) outboard frame mounted urethane "V" blocks shall be provided at the rear of the cab. These dual purpose mounts shall align the cab upon lowering as well as provide non-latching support for the cab in the down position. With this system, extreme chassis twist shall allow the cab to move independently of the rear cab supports, reducing the structural stress damage often caused by outboard dual cab locking systems.

An electric-over-hydraulic cab tilt pump shall be supplied. This pump shall have a remote control for cab tilting operation. The control shall be "safety-yellow" in color.

A manual backup shall be provided for use in the event of electrical failure.

Y\_\_\_\_ N\_\_\_\_

### **CAB TILT INTERLOCK**

The cab lift system shall have a cab tilt interlock. The cab tilt shall not be able to be activated unless the master battery switch is in the on position with the parking brake set.

Y\_\_\_\_ N\_\_\_\_

### **CAB TILT AERIAL INTERLOCK**

A cab tilt interlock shall be installed to prevent the tilting of the cab when the aerial ladder is in a bedded position.

Y\_\_\_\_ N\_\_\_\_

### **INTERIOR FINISH**

The entire interior of the cab shall be painted with spatter paint, solid black in color. Black spatter paint is selected for ease of repairs when the interior is scratched.

The cab metal finish shall be covered with one coat of base self-etching primer to fill the small surface imperfections.

Then the interior of the cab is to be blocked and a coat of sealer-primer is to be sprayed to the interior finish.

Next a sealer primer is applied and will be sanded to a smooth finish ready for final color coat application.

Two (2) coats of finished paint are to be applied to a final thickness of 4 mills.

The following interior components shall be of black materials to match the interior paint color:

- Sun visors
- Cab interior overhead console
- Doghouse console

The interior headliner of the cab shall be black in color.

The interior rear wall covering of the cab shall be black in color.

The interior flooring material of the cab shall be black in color.

The doghouse covering material in the cab shall be black in color.

The dash housing, doghouse console; when so equipped; and the officer's glove box or console shall be black in color.

Y\_\_\_\_ N\_\_\_\_

### **EMS STORAGE CABINET**

A storage compartment, full height x 40" W x 20" D shall be provided on the rear wall with the door opening facing the front of the cab. The door opening shall be a minimum of 35-1/2" wide. The bottom of the cabinet shall contain a panel to raise the floor two inches above the floor of the cab. The inside side walls of the cabinet shall be fitted with unistrut channels for the installation of adjustable shelves.

The entire cabinet shell inside and out shall be completed with a black powder coated paint finish for durability.

The EMS Cabinet shall be installed on centered on the rear wall.

The EMS cabinet shall be provided with a Gortite roll up door. The roll up door shall be constructed of double sided aluminum extrusions connected with a ball and socket joint. The extrusions shall be 1-3/8" wide x 3/8" thick with satin anodized finishing. A flexible EDPM extrusion shall be provided between each slat to insure a weather tight seal. Aluminum extrusions shall be individually replaceable without disassembling the entire door by removing push out clips on each end.

Two (2) adjustable aluminum shelves shall be installed and shall have a flange 1-1/2" deep and a minimum material thickness of .190" up to 30" in length. Each shelf shall be fully adjustable in height and held in place by extruded uprights.

Y\_\_\_\_ N\_\_\_\_

### **CAB EXTERIOR FINISH**

The exterior doors and all fixed cab glass are to be removed from the cab prior to the paint and body process beginning.

The final finish of the cab shall be to fire apparatus standards; exhibiting excellent gloss durability and color retention properties.

Y\_\_\_\_ N\_\_\_\_

## **PREPARATION**

The removal of all contaminants and oxidation is essential to the final effect of a finish system, the cab shall be precleaned with a Wax and Grease Remover and prior to evaporation, towel dried.

To remove all oxidation and foreign materials, the cab shall be sanded with a 180 grit abrasive using an orbital type disc sander.

All weld marks and other major surface imperfections shall be filled with a polyester type body filler, prior to body filler application special attention shall be given to the areas requiring filler again sanding and cleaning.

The body fillers shall be thoroughly mixed in accordance with the manufacturer's directions.

After the final coat of filler is sanded, spray polyester shall be applied in sufficient amounts as to provide a final base and sanded with abrasive paper.

Y\_\_\_\_ N\_\_\_\_

## **PRECLEAN**

Within 45 minutes of pretreat the cab must be again washed with a Wax and Grease Remover using a "Scotch brite pad". Towel dry prior to evaporation.

Special precaution shall be taken NOT to saturate any polyester body fillers with the cleaning solvents.

Y\_\_\_\_ N\_\_\_\_

## **PRETREAT AND PRIMERS**

The pretreat and primer applications shall be made in two independent steps. A combined pre-treat/primer one product application shall not be allowed as a substitute.

The prepared substrate shall be pretreated with an acid curing 2-component Transparent Primer. This pretreat shall be designed to provide corrosion protection and to create an adhesive bond between the substrate and the surface applications.

It is critical that the body fillers not receive a saturation of solvents associated with the pretreat application. Only the pretreat over spray resulting from product application to the adjacent metal areas should be allowed to come in contact with the body fillers.

All polyester body fillers are porous, and shall absorb liquids. Solvents when absorbed not only soften but shall create swelling of the polyester filler. After sanding and later shrink the fillers shall create blemishes in the painted surfaces.

Prior to complete primer application, each area with applied body fillers be precoated with a 2-dry applications of primer (sander surfacer) of which shall be allowed to "Touch Dry" between coats. This procedure shall isolate the filled areas and protect them from subsequent product applications.

The primer (sander surfacer) shall be a poly-acrylic resin, zinc and chromate free surfacer that is designed to create a superb surface smoothness, increase the depth of color, and insure top coat gloss.

The cab after pretreat and precoat shall be primed with a 3 to 4 medium applications of a Hi-Build Tintable Surfacer.

To create a finish base that meets the rigid requirements of the fire and emergency service; the primed surface shall be dry sanded smooth thus removing all texture and surface imperfections with a 320 grit (minimum) sanding abrasive.

Y\_\_\_\_ N\_\_\_\_

**FINISH AND COLOR COATS**

The color coat application shall consist of two to three applications of acrylic urethane color coat. After the color coat has been applied, the cabs shall be sprayed with 1.5 to 2.0 mills of clear coat finish. The clear coat finish is then sanded and buffed to remove any imperfections that can occur during the application of the color coat.

The final sanding and buffing of the clear coat shall result in a flat / glass like finish. The clear coat shall also provide a UV barrier to prevent fading and chalking.

PPG brand urethane materials will be used for the cab exterior paint.

Y\_\_\_\_ N\_\_\_\_

**CAB PAINT WARRANTY**

The chassis manufacturer shall provide a limited parts and labor warranty to the original purchaser of the custom built cab & chassis for a period of sixty (60) months. The warranty period shall commence on the date the vehicle is delivered to the end user. The warranty shall include conditional items listed in the detailed warranty document which shall be provided upon request.

Y\_\_\_\_ N\_\_\_\_

**DRIVER'S SEATING POSITION**

The seat shall be Seats, Inc. 911, air ride suspension, high back seat with a 6" double locking fore and aft slide adjustment. The seat shall have adjustments for height and ride with a contoured thigh support bottom cushion.

A red 3-point, shoulder harness type seat belt shall be supplied for the seat.

Y\_\_\_\_ N\_\_\_\_

**OFFICER'S SEATING POSITION**

The seat shall be Seats, Inc. 911, Series Self-Contained Breathing Apparatus (SCBA) type seat with a fixed bottom cushion and a split head rest. The seat shall contain a SCBA filler pad for when the bottle is not in use.

A red 3-point, shoulder harness type seat belt shall be supplied for the seat.

Y\_\_\_\_ N\_\_\_\_

**SCBA SEAT BRACKET**

Mounted in the seat there shall be a SmartDock Gen II hands-free SCBA holder that is a strap-free docking station that offers a hands-free release when the firefighter rises out of the seat.

Y\_\_\_\_ N\_\_\_\_

**CREW AREA - REAR FACING LEFT OUTBOARD SEAT POSITION**

The seat shall be Seats, Inc. 911, Series Self-Contained Breathing Apparatus (SCBA) type seat with a fixed bottom cushion and a split head rest.

A red lap type, metal to metal quick release seat belt, with automatic seat belt retractor shall be provided for the seat.

Y\_\_\_\_ N\_\_\_\_

**SCBA SEAT BRACKET**

Mounted in the seat there shall be a SmartDock Gen II hands-free SCBA holder that is a strap-free docking station that offers a hands-free release when the firefighter rises out of the seat.

Y\_\_\_\_ N\_\_\_\_

**CREW AREA - REAR FACING RIGHT OUTBOARD SEAT POSITION**

The seat shall be Seats, Inc. 911, Series Self-Contained Breathing Apparatus (SCBA) type seat with a fixed bottom cushion and a split head rest.

A red lap type, metal to metal quick release seat belt, with automatic seat belt retractor shall be provided for the seat.

Y\_\_\_\_ N\_\_\_\_

**SCBA SEAT BRACKET**

Mounted in the seat there shall be a SmartDock Gen II hands-free SCBA holder that is a strap-free docking station that offers a hands-free release when the firefighter rises out of the seat.

Y\_\_\_\_ N\_\_\_\_

**VINYL MATERIAL**

The chassis seats shall have vinyl material in the following applicable areas:

- Seat Base Top
- Seat Base Sides
- Seat Back Support Face
- Seat Back Support Sides
- Seat Headrests

Standard Seat Cushions

Y\_\_\_\_ N\_\_\_\_

**SEAT BELT WARNING LABELS**

The cab shall be equipped with two (2) seat belt warning labels. These labels are to be in full view of the occupants in the seated position.

Y\_\_\_\_ N\_\_\_\_

**VEHICLE DATA RECORDER**

Apparatus shall be equipped with a *Class1* "Vehicle Data Recorder and Seat Belt Warning System" (VDR/SBW) that is connected to the power train CAN (Controller Area Network) bus consisting of transmission (TCM), engine control (ECM) and antilock brake (ABS) modules mounted on the apparatus. The VDR/SBW will function per NFPA 1901 sections 4.11 (Vehicle Data Recorder) utilizing the power train's J1939 data and 14.1.3.10 (Seat Belt Warning) using the *Class1* "Seat Belt Input Module" for seat occupied and belt status information.

The VDR data shall be downloadable by USB cable to a computer using either Microsoft™ or Apple™ Operating Systems

using Class 1/ O.E.M. supplied reporting software.

Y\_\_\_\_ N\_\_\_\_

### **SEAT BELT WARNING SYSTEM**

There shall be a seat belt indicator system supplied in the cab. The indicator system shall indicate seat belt use for each individual seating position when the seat is occupied, the seat belt remains unfastened and the parking brake is released.

A display panel shall be supplied in the dash area. The panel shall have an audible indicators and a red light display to indicate that a seat belt has not been fastened.

Y\_\_\_\_ N\_\_\_\_

### **SEAT BELT WARNING SYSTEM - MONITOR**

Mounted in the overhead console in the driver's area the indicator system shall indicate seat belt use for each individual seating position when the seat is occupied, the seat belt remains unfastened and the parking brake is released.

Y\_\_\_\_ N\_\_\_\_

### **ROLL OVER OCCUPANT PROTECTION**

The cab shall be equipped with a RollTek™ rollover occupant protection system for the driver, officer and two (2) outboard rear facing seating positions which shall include:

**Integrated Roll Sensor IRS** - detects an imminent rollover, activates protective devices and records crash events.

The IRS is an electronic module used to deploy advanced occupant restraint systems in the event of a vehicle roll over. The IRS may also monitor signals from a frontal crash sensor. In response to a roll event or other trigger signal, the IRS activates up to eight safety devices in a pre-programmed sequence. An event recorder tracks onboard data before and after a roll event. Real time diagnostics monitor all critical subsystems. The roll sensor is designed to meet the environmental and electrical conditions of commercial vehicles.

**Integrated Belt Pretension IBP device** (*not available with air suspension seats*) - tightens the seat belt around occupant, securing occupant in seat and positions occupant for contact with integrated head cushion.

The IBP is a pretensioning system using a micro gas generator to pretension the occupants belt during a roll over. The IBP is mounted only in static seating positions. The pretensioner deploys upon receiving a signal from the rollover sensor. The pretensioner retracts the cable and buckle removing slack from the belt. The buckle pretensioner is only effective when you wear your seatbelt.

**Seat Pull-down System S4S** (*air suspension seats only*) - locks seat to lowest position, increases survivable space, tightens belt around occupant, secures occupant in seat and positions occupant for contact with integrated head cushion.

The S4S is a seat and occupant pretensioning system using a stored gas powered actuator to pretension the occupants belt and pull down the suspension seat during a roll over. It is designed to safely move an occupant ranging from a 5<sup>th</sup> percentile female to a 95<sup>th</sup> percentile male, from an elevated position relative to normal driving conditions, to the seats lowest position while maintaining a tightened belt. This action will occur in 100 to 180 milliseconds. For the S4S mechanism to provide adequate impulse to move the mass of a 95<sup>th</sup> percentile occupant in the prescribed time, it is necessary that the device produce a substantial force.

The second essential component to the seat pull down system is the pretensioning ICP bar. The bar is specially designed and incorporates pretensioning action when connected to the actuator. It provides the attachment point for the flexible tether connected to the power unit.

**Inflatable Head Cushion IHC** - The Inflatable Head Cushion protects the head and neck during a crash event. It uses a gas-generating device (a.k.a. inflator) to achieve its inflated state within specified design parameters. The IHC has the

flexibility to be used for roll over events and/or side impact protection, each event requiring its own, unique sensor(s) and/or sensor algorithm.

The IHC is designed to provide adequate head coverage for a range of occupants from 5<sup>th</sup> percentile female to the 95<sup>th</sup> percentile male. The cushion typically deploys and inflates in less than 50 msec after the firing current is applied. In its deployed state, the cushion covers approximately 0.17 sq. meters (1.8 sq. ft.) and occupies a volume of approximately 20 liters (1220 cu.in.). Due to its unique construction and specialized coating, the airbag is capable of maintaining adequate pressure for a minimum of 5 seconds. This device shall affect the driver, officer and adjacent seats to cab side excluding theatre flip-up style seating.

Y\_\_\_\_ N\_\_\_\_

### **FRONT BUMPER**

A 12" high heavy-duty 10 gauge, polished stainless steel, wraparound, 2-rib front bumper shall be provided the full width of the cab.

Y\_\_\_\_ N\_\_\_\_

### **BUMPER REINFORCEMENT**

The bumper shall have a structural steel backing channel reinforcement. This reinforcement shall be bolted to the front frame extension and the bumper bolted to bumper backing reinforcement.

Y\_\_\_\_ N\_\_\_\_

### **BUMPER EXTENSION**

The front frame extension shall be bolted directly to the main rail. The extension and main rail joint shall have a 3/8" thick side plate for reinforcement. The completed apparatus must be able to be lifted at the front bumper without structural damage to the front extension for towing of a disabled vehicle.

The front bumper face shall extend 21 inches ahead of the front face of the cab skin.

Y\_\_\_\_ N\_\_\_\_

### **FRONT SUCTION PIPING**

A 5" front suction pipe shall be provided with victaulic groove on the rear end and a copper vent line from the high to the low point shall be installed for purging air during suction operation. The front suction pipe is to begin 42.81 inches behind the centerline of the front axle, going forward and over the front axle using long sweep 90 degree elbows and 45 degree bends. The suction is to terminate 8.00 inches +/- 1/2 in. forward of the front face of the cab. The pipe shall terminate with a 5" Male National Pipe Thread. The dimension from the centerline of the chassis to the center of the suction pipe inlet termination is to be 27 inches (front view of the chassis, wider if outboard air horns are used).

The front bumper shall have a 3-1/2" radius to provide clearance for the front suction hose to pass through the bumper.

The area around the front suction hose adapter shall be boxed in creating a well, for additional clearance on the hose connection and the ability to have a maximum of 25 feet of soft suction preconnected to the intake.

Y\_\_\_\_ N\_\_\_\_

### **RIGID FEMALE TO MALE ADAPTER**

A Rigid Female to Male Adapter shall be provided. The Rigid Female to Male Adapter shall be constructed of chrome plated brass. It shall be 5" NPT female by 5" NH male.

Y\_\_\_\_ N\_\_\_\_

**SUCTION ADAPTER**

The front suction inlet shall be equipped with a satin finished Kochek, S37S55, 5" NH(F) to 5" Storz to rigid female thread adapter with CC507 Storz cap with chain.

Y\_\_\_\_ N\_\_\_\_

**STYLE 7 3/4" DRAIN VALVE**

An Akron Brass Style 7, 3/4" Drain Valve item 00070001 with brass handle shaft and body shall be installed in the front suction intake pipe. The small and compact drain valve shall be made of brass and have 3/4"NPT female inlet and outlet thread. There shall be a tag on the front bumper labeled 'DRAIN' adjacent to the location of the front suction drain.

Y\_\_\_\_ N\_\_\_\_

**TOW HOOKS**

Two (2) chromed tow hooks shall be provided and shall be attached directly to the front frame extension under the bumper. These tow hooks shall be attached with two Grade 8 bolts with hardened washers and Grade "C" distorted thread locknuts.

Y\_\_\_\_ N\_\_\_\_

**GRAVELSHIELD**

A gravelshield shall be installed filling the area above the extension rails. This gravelshield shall be constructed of .125" thick NFPA non-skid, bright, non-skid, aluminum treadplate. The gravelshield shall be supported at the front by the top flange of the stainless steel bumper. At the rear, the gravelshield shall be supported by a steel substructure.

Y\_\_\_\_ N\_\_\_\_

**CENTER HOSEWELL**

A hosewell shall be installed in the center of the gravelshield. The hosewell shall be constructed of .125" aluminum. The upper edges of the hose well shall be tapered to allow for smooth, snag free removal of the hose. The hosewell shall be 26-1/2" wide x bumper depth deep x (extension - 6") front to back. The hosewell shall be mounted between the bumper extension rails.

Y\_\_\_\_ N\_\_\_\_

**VINYL HOSEWELL COVER**

A vinyl cover shall be provided for the hosewell. The vinyl cover shall be permanently attached at the front of the hosewell next to the front bumper. The end flap of the cover shall be fastened in accordance with NFPA 1901.

The hosewell cover shall be Brilliant Red in color.

Y\_\_\_\_ N\_\_\_\_

**FRONT BUMPER UNDERBODY LIGHTING**

There shall be two (2) 4" round LED ground lights provided at the outer front corners of the front bumper, one (1) each side, to illuminate the area under the front bumper of the truck. All underbody ground lights shall be switched on when the parking brake is set and the apparatus is running with the master battery switch in the "ON" position.

Y\_\_\_\_ N\_\_\_\_

**AIR HORNS**

Dual stutter tone air horns shall be recessed into the front bumper, one each side.

Y\_\_\_\_ N\_\_\_\_

**AIR HORN IGNITION CONTROL**

To eliminate inadvertent operation the chassis air horns shall be operable only when the battery selector and ignition switch are in the "ON" position.

Y\_\_\_\_ N\_\_\_\_

**AIR HORN CONTROL**

The chassis air horns shall be controlled by a lanyard with a 'Y-chain'. The lanyard chain shall be mounted to the center of the overhead console within reach of both the driver and officer and shall terminate at the cab center front.

Y\_\_\_\_ N\_\_\_\_

**ELECTRONIC SIREN**

A Whelen electronic siren control, model 295SLSA1 full feature with 17 Scan-Lock siren tones including Radio Rebroadcast, Public Address, Manual, Wail, Yelp, Air Horn, Electronic Mechanical Siren tones and Piercer tones and hard wired microphone, shall be provided.

The siren control shall be mounted on top of the engine doghouse within reach of the driver and officer.

Y\_\_\_\_ N\_\_\_\_

**Q2B MECHANICAL SIREN**

A FEDERAL Q2B mechanical siren shall be mounted on top of the gravelshield on the left (driver's) side.

Y\_\_\_\_ N\_\_\_\_

**MASTER WARNING LIGHT CONTROL**

To eliminate inadvertent operation the mechanical siren shall be operable only when the Master Warning Light switch is in the "ON" position and the parking brake is released.

A momentary rocker switch shall be provided in the driver's switch panel for operation of the siren brake. This switch shall be backlit with the legend "SIREN BRAKE".

Y\_\_\_\_ N\_\_\_\_

**SIREN CONTROL SWITCH**

One (1) foot switch for the siren shall be provided on left side of the driver's cab floor.

Y\_\_\_\_ N\_\_\_\_

**SIREN SPEAKERS**

There shall be two (2) Cast Products polished aluminum 100 watt speakers provided. The speakers shall be recessed into the front bumper, one each side, immediately outboard of the chassis frame rails.

Y\_\_\_\_ N\_\_\_\_

**ELECTRONIC CHASSIS OPERATOR'S MANUAL**

An electronic Operator's Manual w/Parts List - One Set shall be provided with the chassis.

An electronic Electrical System Manual shall be provided.

- This manual shall provide complete wiring schematics for the vehicle.
- The manual shall be provided with diagrams of the vehicle showing the wiring harness routing within the vehicle. Each of these diagrams shall include the connectors between the harnesses that provide a hyperlink to a drawing of the actual connector where pin functions can be examined.
- Schematics for each system of the vehicle shall be provided with hyperlinks to the connectors for pin designations and to the vehicle drawings for harness location within the vehicle.

An electronic Air System Manual shall be provided.

- This manual shall provide complete air system schematics for the vehicle.
- The manual shall be provided with diagrams of the vehicle showing the air tubing routing within the vehicle.
- Schematics for each system of the vehicle shall be provided with hyperlinks to the tanks and valves and to the vehicle drawings for exact location within the vehicle.

For future use and safety all above listed manuals shall also be permanently installed in the cab within easy reach of the driver position. All information shall be stored electronically and be accessible with standard computer connections. Electronic manuals shall be encased in a dust and weather tight metal capsule that includes a dust and weather tight cap secured with a lanyard chain. To prevent loss this electronic storage shall be not be removable from cab.

Y\_\_\_\_ N\_\_\_\_

**MERITOR/ROCKWELL STANDARD AXLE WARRANTY**

The vehicle shall be covered by Arvin/Meritor warranty that is in effect at the time of the vehicle production.

Y\_\_\_\_ N\_\_\_\_

**STANDARD TRANSMISSION WARRANTY**

The chassis shall have a five (5) year unlimited mileage as defined in the Allison New Product Warranty.

Y\_\_\_\_ N\_\_\_\_

**ENGINE WARRANTY**

The engine shall have the standard 5 year warranty from the engine manufacturer that is in effect at the time of the vehicle is placed into service.

Y\_\_\_\_ N\_\_\_\_

**CAB STRUCTURAL WARRANTY**

The cab structure shall be warranted for a period of ten (10) years or fifty thousand 50,000 miles which ever may occur first. The warranty shall include conditional items listed in the detailed warranty document which shall be provided upon request.

Y\_\_\_\_ N\_\_\_\_

**CAB CORROSION WARRANTY**

The cab shall have a ten (10) year cab corrosion perforation warranty according to the terms and conditions outlined in the warranty statement.

Y\_\_\_\_ N\_\_\_\_

**CAB & CHASSIS WARRANTY**

The chassis manufacturer shall provide a limited parts and labor warranty to the original purchaser of the custom built cab & chassis for a period of twelve (12) months, or the first 24,000 miles, whichever occurs first. The warranty period shall commence on the date the vehicle is delivered to the end user. The warranty shall include conditional items listed in the detailed warranty document which shall be provided upon request.

Y\_\_\_\_ N\_\_\_\_

**PUMP COMPARTMENT**

The gauge panel door shall be a double wall stainless steel door supported by a 3/8 inch diameter hinge pin. The inner wall shall protect pressure gauges from damage. Inside the access door; there shall be a clean well build appearance.

The pump module shall be constructed from stainless steel piping, stainless steel panels, and a stainless steel framework. Pipe threads are not allowed on plumbing larger than 1-1/2 inch in diameter. The pump module design shall employ Victaulic coupling connections in the pump module to save time when servicing a component. Installation of components without the use of pipe threads allows for "drop-out" maintenance of critical components without disassembly of entire piping systems. Drop in valves and manifolds with Victaulic couplings are only the start of the serviceability designed into this pump module.

The pump compartment shall be separate from the hose body and compartments so that each may flex independently of the other. It shall be a fabricated assembly of stainless steel tubing, angles and channels, which does not support the fire pump and or running boards. The pump compartment shall be mounted onto the chassis through rubber biscuits in a four point pattern to allow for a chassis frame twist. Pump compartment, pump, plumbing and gauge panels shall be removable from the chassis in a single assembly and shall have an approximate width of 47". The pump compartment shall be a modular design. There shall be a pump module mounting system that allows for the twisting movement of the truck frame without undue stress loading of the pump module.

A stainless steel framework shall provide the support for the mounting of the pump lower panels. Stainless steel structure shall be provided as a support behind all control push-pull handles enabling a firm foundation for operation of the valve control.

An upper framework shall encompass the crosslay hose bed. The floor of this section shall be a bolt-on design to provide access for major repairs and or service.

Apparatus taking exception to any portion of this requirement will not be acceptable.

Y\_\_\_\_ N\_\_\_\_

**RUNNING BOARDS**

The running boards shall be separate from the hose body, compartments, and pump compartment so that each may flex independently of the other and to allow water to flow freely away from the running board area. Separation of the running boards and support structure from the hose body, compartments and pump compartment is desired to provide field service of the running board without major repairs to the pump compartment in the event of an accident.

The left side running board shall be a slide-out standing platform. The slide-out standing platform shall be covered in Laser Grip stainless steel and shall have heavy duty self-locking roller bearing slides. The slide-out standing platform and running board shall be an integral component and be mounted on the same plane as the apparatus body rub rails. The slide-out standing platform shall have a capacity of at least 500lbs.

Y\_\_\_ N\_\_\_

The steel running board supports shall be bolted directly to the chassis frame rails to provide proper support. The running board step surface shall be covered in Laser Grip stainless steel meeting the current revision of NFPA 1901 for step requirements.

**RIGHT RUNNING BOARD HOSEWELL**

The right running board shall be provided with an integral smooth plate hose well with a 1.5 cubic feet capacity.

Y\_\_\_ N\_\_\_

**STRAPS, RUNNING BOARD HOSEWELL**

Two (2) straps shall be provided for the running board hosewell to secure hose in the hosewell.

Y\_\_\_ N\_\_\_

**DUNNAGE COMPARTMENT OVER PUMP**

There shall be a dunnage compartment furnished on top of the pump module. The floor shall be bolted in place and removable for access to the fire pump components for major service.

Y\_\_\_ N\_\_\_

**DUNNAGE COMPARTMENT GRABRAILS**

Two (2) bright anodized extruded aluminum grab rails shall be provided, one (1) each side of the pump house on the side of the dunnage compartment just below the top edge mounted horizontal to provide easy access to the dunnage compartment. Molded rubber gaskets shall be installed under the grab handles to protect the surface of the compartment.

Y\_\_\_ N\_\_\_

**PUMP COMPARTMENT WORK LIGHT**

The pump compartment shall have one (1) 4" round white LED work light to provide illumination of the pump compartment. The light shall have a weather resistant, toggle style on/off switch located inside the pump compartment adjacent to the door hinge area. The power for the pump module light shall be switched thru the battery master switch.

Y\_\_\_ N\_\_\_

**PUMP SERVICE ACCESS REQUIREMENTS**

It is the opinion that service access to the pump, valves, gauges and controls are of the utmost importance. Special consideration shall be taken when evaluating the pump module design of the offeror. Pump panels that offer little to no access without the use of tools shall not be considered compliant with this requirement.

Y\_\_\_ N\_\_\_

## **PUMP CONTROL PANELS**

All pump controls and gauges shall be located at the left (street) side of the apparatus and properly identified. The layout of the pump control panel shall be ergonomically efficient and systematically organized. The pump operator's panel shall be removable in two (2) main sections for ease of maintenance. The pump and gauge panels shall be constructed of 12-gauge stainless steel. The gauge panel shall contain a panel for mounting of all instruments, engine monitoring system, and pressure control system.

The gauge panel shall be a double panel door design to protect in the enclosed door all gauge tubing, switch, and control wiring. The gauge panel exterior shall be made of 12-gauge stainless steel. The inner pan shall bolt onto the stainless exterior panel. There shall be an access panel in the inner panel easily removable for control or gauge service or replacement.

The gauge panel door shall be designed as an opening pump house service door on the street (left) side of the pump house. This gauge panel door shall provide an opening minimum size of 41 inches wide by 14 inches in height.

The lower section of the panel shall contain all inlets, outlets, and drains. All push-pull valve controls shall have quarter turn locking control rods with chrome plated zinc tee handles. Guides for the push-pull control rods shall be chrome plated zinc castings securely mounted to the pump panel. Push-pull valve controls shall be capable of locking in any position. The control rods shall pull straight out of the panel and shall be equipped with universal joints to eliminate binding.

There shall be an opening pump house service door on the curb (right) side of the pump house. This door shall provide an opening minimum size of 41 inches wide by 14 inches in height.

Y\_\_\_\_ N\_\_\_\_

## **PUMP PANEL IDENTIFICATION TAGS**

The identification tag for each valve shall be recessed in the face of the control handle. All discharges shall have color-coded plastic identification tags, with each discharge having its own unique color. Color-coding shall include the labeling of the outlet and the drain for each corresponding discharge. All identification labels nomenclature will be selected by Boles Acres Fire Dept. and furnished to builder.

Y\_\_\_\_ N\_\_\_\_

## **PUMP PANEL FINISH**

All stainless panels used in the construction of the pump house shall have a brushed finish.

Y\_\_\_\_ N\_\_\_\_

## **CONTROLS AND GAUGES**

The following shall be provided on the pump and gauge panels in a neat and orderly fashion. The gauge panel shall include the following:

Y\_\_\_\_ N\_\_\_\_

## **PRESSURE GOVERNOR, MONITORING, and MASTER PRESSURE DISPLAY**

Fire Research InControl series TGA400-A00 pressure governor and monitoring display kit shall be installed. The kit shall include a control module, intake pressure sensor, discharge pressure sensor, and cables. The control knob shall be 2" in diameter with no mechanical stops, have a serrated grip, and a red idle push button in the center. It shall not extend more than 1-3/4" from the front of the control module. Inputs for monitored information shall be from a J1939 databus or independent sensors. Outputs for engine control shall be on the J1939 databus or engine specific wiring.

The following continuous displays shall be provided:

Pump discharge; shown with four daylight bright LED digits more than 1/2" high  
Pump Intake; shown with four daylight bright LED digits more than 1/2" high  
Pressure / RPM setting; shown on a dot matrix message display  
Pressure and RPM operating mode LEDs  
Throttle ready LED  
Engine RPM; shown with four daylight bright LED digits more than 1/2" high  
Check engine and stop engine warning LEDs  
Oil pressure; shown on a dual color (green/red) LED bar graph display  
Engine coolant temperature; shown on a dual color (green/red) LED bar graph display  
Transmission Temperature: shown on a dual color (green/red) LED bar graph display  
Battery voltage; shown on a dual color (green/red) LED bar graph display.

The dot-matrix message display shall show diagnostic and warning messages as they occur. It shall show monitored apparatus information, stored data, and program options when selected by the operator. All LED intensity shall be automatically adjusted for day and night time operation.

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

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

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

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

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

The pressure governor, monitoring and master pressure display shall be programmed to interface with a specific engine.

Y\_\_\_\_ N\_\_\_\_

## **PRESSURE GAUGES**

Each line pressure gauge shall be mounted immediately above the control for the corresponding valve. The individual line pressure gauges for the discharges shall be 2-1/2" in diameter with white dial face gauges with black lettering and markings. The gauges shall be a compound style gauge with a vacuum/pressure range of 0 - 400 psig.

The gauges shall be fluid filled with pulse and vibration dampening Interlube to lubricate the internal mechanisms to prevent lens condensation and to ensure proper operation to -40 degrees F. The cases shall be temperature compensated with an internal breathing diaphragm to permit fully filled cases and to allow a rigid lens with a distortion free viewing area. The gauge accuracy for the gauge shall be plus or minus 2% mid-scale, plus or minus 3% balance, per ANSI B40.1, Grade 1A.

To prevent internal freezing and to keep contaminants from entering the gauge, the stem and bourdon tube shall be filled

with low temperature oil and be sealed from the water system using an isolating diaphragm located in the stem. A bright metal bezel shall be supplied for resistance to corrosion and to protect the lens and case from damage.

All line pressure gauges shall be mounted adjacent to the corresponding discharge control tee handles.

Y\_\_\_\_ N\_\_\_\_

### **LED GAUGE LIGHTING**

The 2-1/2" pressure gauges shall be equipped with LED back lighting.

Y\_\_\_\_ N\_\_\_\_

### **PUMP PANEL LIGHTING**

The pump operator's panel shall be supplied with a LED light system. LED strip lights with a stainless steel hood shall be mounted across the top of the pump panel gauges and controls.

LED strip lights with a stainless steel hood shall be provided on each side of the pump module above the side panels.

All pump module lighting shall illuminate when the parking brake is engaged.

Y\_\_\_\_ N\_\_\_\_

### **DRAIN DISCHARGES**

The 3/4 inch drain valves shall be equipped with 90-degree fittings to direct the discharge water beneath the pump module away from the pump operator's panel.

Y\_\_\_\_ N\_\_\_\_

### **AIR HORN ACTIVATION SWITCH**

A switch shall be located on the pump panel to activate the chassis air horn. The switch shall be a momentary pushbutton type switch with a red cover. The switch shall be supplied with the proper identification label.

Y\_\_\_\_ N\_\_\_\_

### **WATER TANK INDICATOR**

Fire Research TankVision model WLA200-A00 tank indicator kit shall be installed. The kit shall include an electronic indicator module, a pressure sensor, and a 10' sensor cable. The indicator shall show the volume of water in the tank on nine (9) easy to see super bright LEDs. A wide view lens over the LEDs shall provide for a viewing angle of 180 degrees. The indicator case shall be waterproof, manufactured of aluminum, and have a distinctive blue label.

The program features shall be accessed from the front of the indicator module. The program shall support self-diagnostics capabilities, self-calibration, and a data link to connect remote indicators. Low water warnings shall include flashing LEDs at 1/4 tank, down chasing LEDs when the tank is almost empty, and an output for an audio alarm.

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

Y\_\_\_\_ N\_\_\_\_

### **PUMP MANUFACTURER AND MODEL**

The pump shall be a Hale Q-MAX model midship pump.

Y\_\_\_\_ N\_\_\_\_

### **PUMP CONSTRUCTION AND ASSEMBLY**

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

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

Pump body shall be horizontally split, on a single plane in two (2) sections for easy removal of entire impeller assembly including wear rings and bearings from beneath the pump without disturbing piping or the mounting of the pump in chassis. The pump shall have one double suction impeller. The pump body shall have two opposed discharge volute cutwaters to eliminate radial unbalance.

Pump shaft to be rigidly supported by three bearings for minimum deflection. One (1) high lead bronze sleeve bearing to be located immediately adjacent to the impeller (on side opposite the gearbox). The sleeve bearing is to be lubricated by a force fed, automatic oil lubricated design, pressure balanced to exclude foreign material. The remaining bearings shall be heavy duty, deep groove ball bearings in the gearbox and they shall be splash lubricated.

Pump impeller shall be hard, fine grain bronze of the mixed flow design; accurately machined and individually balanced. The vanes of the impeller intake eyes shall be of sufficient size and design to provide ample reserve capacity utilizing minimum horsepower. Impeller clearance rings shall be bronze, easily renewable without replacing impeller or pump volute body, and of wraparound double labyrinth design for maximum efficiency.

The pump shaft shall be heat-treated, electric furnace, corrosion resistant stainless steel for longer shaft life. Pump shaft must be sealed with double-lip oil seal to keep road dirt and water out of gearbox.

Y\_\_\_\_ N\_\_\_\_

### **PUMP GEARBOX**

The gearbox shall be assembled and tested at the pump manufacturer's factory. Pump gearbox shall be of sufficient size to withstand up to 16,000 pounds feet of torque of the engine. 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" 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.

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

Three green warning lights shall be provided to indicate to the operator when the pump has completed the shift from Road to Pump position. Two (2) green lights to be located in the truck driving compartment and one (1) green light on pump

operator's panel adjacent to the throttle control. All lights shall have appropriate identification/instruction plates.

Y\_\_\_\_ N\_\_\_\_

### **PUMP RATING AND TEST REQUIREMENTS**

The pump shall be of a size and design to mount on the chassis rails of commercial and custom truck chassis, and have the capacity of 2000 gallons per minute (U.S. GPM), NFPA 1901 rated performance. The pump shall deliver the percentage of rated discharge at pressures indicated below:

100 percent of rated capacity at 150 pounds net pressure  
70 percent of rated capacity at 200 pounds net pressure  
50 percent of rated capacity at 250 pounds net pressure  
100 percent of rated capacity at 165 pounds net pressure

The entire pump shall be assembled and tested at the pump manufacturer's factory. The pump shall be driven by a driveline from the truck transmission. The engine shall provide sufficient horsepower and RPM to enable pump to meet and exceed its rated performance.

Y\_\_\_\_ N\_\_\_\_

### **ALTITUDE REQUIREMENTS**

The apparatus shall be designed to meet the specified rating at 4500' altitude.

Y\_\_\_\_ N\_\_\_\_

### **PUMP COOLING LINE**

A 3/8" cooling line shall be installed to recirculate water from the pump back through the pump transfer case, to cool the pump during prolonged pumping operations. The cooling line shall be controlled at the operator's position with a Class 1 valve.

Y\_\_\_\_ N\_\_\_\_

### **AIR PRIMER**

The pump shall be furnished with an air driven venturi priming system. The system shall be plumbed to the chassis air. A switch to control the air primer shall be provided on the pump operator's panel.

Y\_\_\_\_ N\_\_\_\_

### **PNEUMATIC PUMP SHIFT**

The pump shift shall be air operated and shall incorporate an air double action piston to shift from road to pump and back. A manual or electric operated pump shift mechanism is not acceptable. The pump shift switch shall be mounted in the cab and identified as "AIR PUMP SHIFT" and include instructions permanently inscribed on the pump shift switch plate. The in-cab operating valve uses a spring loaded locking collar to prevent it from accidentally being moved.

The pump shift control assembly shall incorporate an indicating light system, which will notify the operator when the shift has been completed to PUMP and when the chassis transmission is in correct pumping gear.

The switch that activates the lights must be mounted on the pump transmission and positioned so that the pump shift arm activates the switch only when the shift arm has completed its full travel into PUMP position. An additional indicator light shall be provided adjacent to the throttle control at the pump operator's panel to indicate a completion of the pump shift.

Y\_\_\_\_ N\_\_\_\_

### **MECHANICAL SEAL**

The fire pump shall be provided with a mechanical pump seal. One (1) only required on the suction, inboard, side of the pump. The mechanical seal shall be two inches in diameter and shall be spring loaded, maintenance free and self-adjusting. Mechanical seal construction shall be a carbon sealing ring, stainless steel coil spring, Viton rubber boot, and a tungsten carbide seat with Teflon backup seal.

Y\_\_\_\_ N\_\_\_\_

### **ANODE SYSTEM**

To reduce the effect of galvanic action the pump shall be equipped with two alloy (2) anodes. One anode is to be installed on the inlet (suction) side of the system and one anode is to be installed on the pressure (outlet) side of the system.

The anode brass cap is to be drilled with a 1/8" diameter hole to provide an indicator when the anode alloy element is to be replaced.

Y\_\_\_\_ N\_\_\_\_

### **THERMAL PROTECTION**

The pump shall be equipped with a TRV-L, thermal protection device, which monitors the water temperature of the pump and relieves water when the temperature inside the pump exceeds the preset value of the relief valve (120 degrees F / 49 degrees C).

The TRV shall automatically dump a controlled amount of water to the atmosphere or back to the tank when the pump water temperature exceeds the preset value. The valve shall automatically close when the water temperature cools to below the preset value.

An aluminum composite panel placard with a visual warning lamp and test button shall be provided on the operator's panel. The warning light shall illuminate when the Thermal Relief Valve is open and discharging water.

Y\_\_\_\_ N\_\_\_\_

### **SUCTION PRESSURE RELIEF VALVE**

Task Force Tips model #A1820 pressure relief valve shall be provided. The valve shall have an easy to read adjustment range from 90 to 300 PSI in 90, 125, 150, 200, 250, 300 PSI increments. For corrosion resistance the cast aluminum valve shall be hardcoat anodized with a powder coat interior and exterior finish. The valve shall be configured for a Hale pump, and have a 2" male NPT threaded discharge outlet. The unit shall be covered by a five-year warranty.

The discharge side of the intake relief valve shall be plumbed to the right side below the running boards, away from but, visible to the pump operator, and shall terminate with an unthreaded pipe. The adjustment control shall be located behind the street side pump panel.

Y\_\_\_\_ N\_\_\_\_

### **MASTER DRAIN**

The apparatus shall be equipped with a Class 1 Manual Master Pump Drain for draining of the lower pump cavities, volute and selected water-carrying lines and accessories. The all brass and stainless steel construction allows for operation up to 600 psi.

Y\_\_\_\_ N\_\_\_\_

### **UL TEST**

The pump shall undergo an Underwriters Laboratories Incorporated test per Class A requirements of NFPA 1901 prior to delivery of the completed apparatus. The UL acceptance certificate shall be furnished with the apparatus on delivery.

Y\_\_\_\_ N\_\_\_\_

### **FIRE PUMP WARRANTY**

Standard 5 year warranty (Parts and Labor for the first two years, parts only years 3 - 5) See Hale warranty for full details.

Y\_\_\_\_ N\_\_\_\_

### **ELECTRONIC PUMP MANUALS**

Two (2) sets of electronic fire pump service and operation manuals shall be provided with the completed apparatus.

Y\_\_\_\_ N\_\_\_\_

### **LEFT SIDE STEAMER INLET**

There shall be one (1) steamer inlet furnished on the left side pump panel. The suction inlet shall have 6" NST thread. The suction inlet shall have a removable strainer provided inside the external inlet.

Y\_\_\_\_ N\_\_\_\_

### **LARGE DIAMETER CAP**

A six (6) inch chrome plated cap with long handles shall be supplied. The cap shall be capable of withstanding 500 PSI and be trimmed with the apparatus manufacturer's logo in the center of the cap.

Y\_\_\_\_ N\_\_\_\_

### **RIGHT SIDE STEAMER INLET**

There shall be one (1) steamer inlet furnished on the right side pump panel. The suction inlet shall have 6" NST thread. The suction inlet shall have a removable strainer provided inside the external inlet.

Y\_\_\_\_ N\_\_\_\_

### **HALE MIV VALVE - RIGHT SIDE**

There shall be a full flow Hale MIV-E valve furnished on the officer's side pump panel. The gate valve shall have an electrically operated control on the pump operator's panel. The inlet valve shall be a full flow butterfly type valve designed to mount on the fire pump between the suction extension and suction tube behind the pump compartment panel. The valve shall not interfere with other suction or discharge openings on the fire pump or with pump operating controls when properly mounted.

### **SUCTION PRESSURE RELIEF VALVE**

Task Force Tips model #A1820 pressure relief valve shall be provided. The valve shall have an easy to read adjustment range from 90 to 300 PSI in 90, 125, 150, 200, 250, 300 PSI increments. For corrosion resistance the cast aluminum valve

shall be hardcoat anodized with a powder coat interior and exterior finish. The valve shall be configured for Hale pump, and have a 2" male NPT threaded discharge outlet. The unit shall be covered by a five-year warranty.

The discharge side of the intake relief valve shall be plumbed to the right side below the running boards, away from but, visible to the pump operator, and shall terminate with an unthreaded pipe. The adjustment control shall be located behind the street side pump panel.

The air bleeder valve shall be mounted on the lower right pump panel drain panel. Air bleeder valve connections shall have a restriction no larger than 3/4" (19 mm) to prevent water hammer when filling hose.

Y\_\_\_\_ N\_\_\_\_

### **LARGE DIAMETER CAP**

A six (6) inch chrome plated cap with long handles shall be supplied. The cap shall be capable of withstanding 500 PSI and be trimmed with the apparatus manufacturer's logo in the center of the cap.

Y\_\_\_\_ N\_\_\_\_

### **GATED FRONT SUCTION**

A front suction intake shall be provided. Suction pipe shall be Schedule 40, 5" ID in size, and shall be provided with quarter-turn bronze flange mounted drain valves at all low points of the line. The front suction shall be bolted to the pump and be assembled with a minimum of two (2) heavy duty Victaulic type couplings.

Y\_\_\_\_ N\_\_\_\_

### **SUCTION MID DRAIN VALVE**

An Akron Brass Style 7, 3/4" Drain Valve item 00070001 with brass handle shaft and body shall be installed in the mid section of the front intake pipe. The small and compact drain valve shall be made of brass and have 3/4"NPT female inlet and outlet thread.

The push-pull control shall be extended to the side of the apparatus beneath the running board area. There shall be a tag adjacent to the control labeled 'DRAIN'.

Y\_\_\_\_ N\_\_\_\_

### **ELECTRICALLY OPERATED SUCTION VALVE**

The suction valve shall be electrically operated and have control switch at the pump operator's panel. The power valve operating mechanism shall prevent movement of the valve from the fully closed position to the fully open position or vice versa, in less than three (3) seconds. The control switch shall have a colored identification label. There shall be a three light indicator provided with one (1) green, one (1) yellow and one (1) red LED to indicate the valve position.

Y\_\_\_\_ N\_\_\_\_

### **LEFT SIDE INTAKE**

There shall be an intake located on the left (street) side rear of the pump and shall contain:

A 2-1/2" intake shall be provided. The inlet shall have a 2-1/2" quarter-turn swing-out valve. The inlet shall be provided with

a 2-1/2" NST female swivel that extends through the pump panel.

The inlet valve shall have a push-pull type control handle located adjacent to the valve.

One (1) 2-1/2" chrome plated rocker lug plug with chain shall be supplied.

Y\_\_\_\_ N\_\_\_\_

**REAR INLET**

There shall be a 4" inlet located at the rear of the apparatus body. The inlet shall be connected to the aerial waterway. The inlet shall be plumbed with 4" ID, Schedule 40 stainless steel pipe terminating in a 4" NPT thread.

There shall be a bolt-on stainless steel trim panel around the inlet/outlet opening.

One (1) 4" chrome plated rocker lug plug with chain shall be supplied.

Y\_\_\_\_ N\_\_\_\_

**LEFT SIDE DISCHARGE #1**

The forward discharge on the left (street) side of the pump panel shall contain:

A 2-1/2" discharge shall be provided. The discharge outlet shall have a 2-1/2" quarter-turn swing-out valve. The discharge shall be provided with chrome plated 30-degree discharge elbow with 2-1/2" NST male threads that extends through the pump panel.

Y\_\_\_\_ N\_\_\_\_

**DISCHARGE CAP**

One (1) chrome plated, Class 1, 2-1/2" rocker lug cap with lug vent and chain shall be furnished.

Y\_\_\_\_ N\_\_\_\_

**LEFT SIDE DISCHARGE #2**

The second from the forward discharge on the left (street) side of the pump panel shall contain:

A 2-1/2" discharge shall be provided. The discharge outlet shall have a 2-1/2" quarter-turn swing-out valve. The discharge shall be provided with chrome plated 30-degree discharge elbow with 2-1/2" NST male threads that extends through the pump panel.

Y\_\_\_\_ N\_\_\_\_

**DISCHARGE CAP**

One (1) chrome plated, Class 1, 2-1/2" rocker lug cap with lug vent and chain shall be furnished.

Y\_\_\_\_ N\_\_\_\_

**RIGHT SIDE DISCHARGE #3**

The forward discharge on the right (curb) side of the pump panel shall contain:

A 2-1/2" discharge shall be provided. The discharge outlet shall have a 2-1/2" quarter-turn swing-out valve. The discharge

shall be provided with chrome plated 30-degree discharge elbow with 2-1/2" NST male threads that extends through the pump panel.

Y\_\_\_\_ N\_\_\_\_

**DISCHARGE CAP**

One (1) chrome plated, Class 1, 2-1/2" rocker lug cap with lug vent and chain shall be furnished.

Y\_\_\_\_ N\_\_\_\_

**RIGHT SIDE DISCHARGE #4**

The second from the forward discharge on the right (curb) side of the pump panel shall contain:

A 3" discharge shall be provided. The discharge outlet shall have a 3" quarter-turn swing-out valve. The discharge shall be provided with chrome plated 30-degree discharge elbow with 3" NST male threads that extends through the pump panel. A 3 inch NST to 4 inch Storz adaptor with cap will be shipped loose.

Y\_\_\_\_ N\_\_\_\_

**DISCHARGE CAP**

One (1) chrome plated, Class 1, 3" rocker lug cap with lug vent and chain shall be furnished.

Y\_\_\_\_ N\_\_\_\_

**AERIAL DISCHARGE AND CONTROL VALVE**

The aerial pump discharge outlet shall be plumbed with 4" ID, Schedule 40 stainless steel pipe. The aerial pump discharge shall have a 3" "Slow-Cloz" quarter-turn, swing out valve, manual push/pull, locking control on the pump operator's panel.

The aerial discharge outlet shall be plumbed to the aerial waterway. An adjustable relief valve to dump water away from the operator's panel shall be installed in the aerial supply line between the butterfly valve and the swivel.

Y\_\_\_\_ N\_\_\_\_

**FRONT JUMPLINE**

A 1-1/2" discharge shall be located at the front bumper. The front discharge shall be plumbed using 2" stainless steel pipe and wire reinforced high pressure hose coupled with stainless steel fittings. The front discharge outlet shall have a 2" quarter-turn swing out valve with control on pump operator's panel. The front discharge shall be provided with a 1-1/2" polished stainless steel, 90-degree swivel adapter with 1-1/2" NST male outlet.

The jumpline swivel shall be located on top of the gravelshield adjacent to the hosewell.

Y\_\_\_\_ N\_\_\_\_

**VALVE CONTROL**

The discharge valve shall be a 2" swing out type. Control of the valve shall be accomplished using a manual locking control on pump operator's panel.

Y\_\_\_\_ N\_\_\_\_

**AUTOMATIC DRAIN VALVE**

One (1) Class 1, 3/4" automatic drain valve shall be supplied.

Y\_\_\_\_ N\_\_\_\_

**PUMP DUNNAGE AREA DIMENSIONS**

The area behind of the crosslays shall be the dunnage area of the pump house. This area shall be enclosed with approximate dimensions of 68" wide x 19" deep x 22.25" front to back.

Y\_\_\_\_ N\_\_\_\_

**TRIPLE CROSSLAY HOSEBED**

The crosslays shall be arranged on top of the pump module with the #1 crosslay toward the front of the pump house and the #2 crosslay in the center and #3 immediately behind #2.

Y\_\_\_\_ N\_\_\_\_

**#1 CROSSLAY**

The #1 crosslay shall be equipped with a 1-1/2" male NST outlet. The crosslay shall be plumbed with 2" Schedule 40 stainless steel high pressure pipe. A 2" quarter turn ball valve shall be used to control water flow. The outlet shall be equipped with a 2" polished stainless steel 90 degree swivel with 1-1/2" male NST thread located in the hosebed.

This crosslay bed shall be capable of carrying a minimum of two hundred feet (200') of 1-3/4" double jacketed hose. The crosslay hosebed shall have inside dimensions of 4-1/4" wide x 19" tall x 72" wide.

The crosslay valve control shall be mounted on the operator's panel.

Y\_\_\_\_ N\_\_\_\_

**DRAIN VALVE**

A 1/4 turn drain valve shall be installed. The valve shall be brass with 3/4" NPT female inlet and outlet thread.

Y\_\_\_\_ N\_\_\_\_

**CROSSLAY DIVIDER**

A crosslay divider shall be provided between the #1 and #2 crosslay. The divider shall be constructed from 1/4" thick abraded aluminum plate mounted on a base T-extrusion that provides lower support the length of the divider. There shall be a hand hole on each side of the divider to assist the firefighter.

Y\_\_\_\_ N\_\_\_\_

**#2 CROSSLAY**

The #2 crosslay shall be equipped with a 2-1/2" male NST outlet. The crosslay shall be plumbed with 2-1/2" Schedule 40 stainless steel high pressure pipe. A 2-1/2" quarter turn ball valve shall be used to control water flow. The outlet shall be equipped with a 2-1/2" polished stainless steel 90 degree swivel with 2-1/2" male NST thread located in the hosebed.

This crosslay bed shall be capable of carrying a minimum of two hundred feet (200') of 2-1/2" double jacketed hose. The crosslay hosebed shall have inside dimensions of 9-3/4" wide x 19" tall x 72" wide.

The crosslay valve control shall be mounted on the operator's panel.

Y\_\_\_\_ N\_\_\_\_

**DRAIN VALVE**

A 1/4 turn drain valve shall be installed. The valve shall be brass with 3/4" NPT female inlet and outlet thread.

Y\_\_\_\_ N\_\_\_\_

**CROSSLAY DIVIDER**

A crosslay divider shall be provided between the #2 and #3 crosslay. The divider shall be constructed from 1/4" thick abraded aluminum plate mounted on a base T-extrusion that provides lower support the length of the divider. There shall be a hand hole on each side of the divider to assist the firefighter.

Y\_\_\_\_ N\_\_\_\_

**#3 CROSSLAY**

The #3 crosslay shall be equipped with a 1-1/2" male NST outlet. The crosslay shall be plumbed with 2" Schedule 40 stainless steel high pressure pipe. A 2" quarter turn ball valve shall be used to control water flow. The outlet shall be equipped with a 2" polished stainless steel 90 degree swivel with 1-1/2" male NST thread located in the hosebed.

This crosslay bed shall be capable of carrying a minimum of two hundred feet (200') of 1-3/4" double jacketed hose. The crosslay hosebed shall have inside dimensions of 4-1/4" wide x 19" tall x 72" wide.

The crosslay valve control shall be mounted on the operator's panel.

Y\_\_\_\_ N\_\_\_\_

**DRAIN VALVE**

A 1/4 turn drain valve shall be installed. The valve shall be brass with 3/4" NPT female inlet and outlet thread.

Y\_\_\_\_ N\_\_\_\_

**CROSSLAY HOSE GUIDES**

Brushed stainless steel hose guides shall be provided on the left and right side of the crosslays.

Y\_\_\_\_ N\_\_\_\_

**CROSSLAY HOSEBED COVER**

A vinyl coated nylon hosebed cover shall be provided over the crosslay hosebeds.

The vinyl crosslay cover shall be Black in color.

Y\_\_\_\_ N\_\_\_\_

**CLASS A & B FOAM SYSTEM**

The foam system and automatic refill systems must include all components necessary to supply both class A and class B foam as recommended by the system manufacture.

A Hale "FoamLogix 2.1A" 2.1 GPM foam system shall be supplied on the apparatus. The apparatus shall be equipped with an automatic electronically controlled, direct injection, rotary gear pump, discharge side foam proportioning system. Foam proportioning operation shall be based on direct measurement of water flow, and remain consistent within the specified flows and pressures.

Y\_\_\_\_ N\_\_\_\_

## **SYSTEM REQUIREMENTS**

The complete foam proportioning system shall include the following:

- 1) Foam Pump
- 2) Control System
- 3) Foam Concentrate Strainers
- 4) Integral Check Valve/Injector Fitting.
- 5) Flow meter
- 6) Control Cables
- 7) Low Tank Level Switches
- 8) Water Discharge Check Valves
- 9) Two (2) 10 gallon Foam concentrate storage tanks

Y\_\_\_\_ N\_\_\_\_

## **FOAM PUMP**

The foam proportioning system shall be compatible with Class A and B foam concentrates. The foam proportioning system shall be capable of delivering the rated foam concentrate flow with the above mentioned foam concentrate type. The foam proportioning system shall be based on an electric motor driven, rotary gear foam concentrate pump, rated at 2.1GPM (7.9 LPM) foam concentrate flow rate with maximum operating pressure of 400 PSIG (28 bar).

The foam pump/motor assembly shall be permanently attached to an apparatus mountable base plate. A foam concentrate flow meter shall be integral to the foam concentrate pump. The foam concentrate flow meter shall provide a signal to the electronic control unit to make sure the proper amount of foam concentrate is injected into the discharge stream. The entire base plate mounted assembly shall have electrical components sealed to NEMA 4X or equal for mounting in the apparatus pump compartment or any suitable location on the apparatus.

Y\_\_\_\_ N\_\_\_\_

## **FOAM CONCENTRATE STRAINERS**

Field serviceable foam concentrate strainers shall be provided in the foam concentrate suction line. When the strainer shall not be subject to flushing water pressure a plastic bodied in-line strainer shall be used. The strainer body shall be constructed of plastic with a stainless steel mesh screen and shall be compatible with Class A foam concentrates. A shutoff valve shall be provided to enable isolation of the strainer for service. The strainer shall be mounted in the pump compartment. The strainer shall be a low pressure device and shall not be subject to flush water pressure.

Where strainers are subject to flush water pressure, panel mounted field serviceable foam concentrate strainers rated at 500 PSIG (34 BAR) minimum shall be installed on the pump panel. The strainer body shall be constructed of brass with a chrome cap and an easily removable stainless steel mesh screen for field servicing. A 1-½ inch strainer with ¾ inch NPT connection ports shall be used for Class A foam concentrate.

Y\_\_\_\_ N\_\_\_\_

## **INJECTOR FITTING AND CHECK VALVES**

To prevent contamination of the foam concentrate supply, foam concentrate shall be injected into the water pump discharge stream through an integral check valve/injector fitting. The check valve/injector fitting shall be of one piece construction of brass and stainless steel. To prevent contamination of the water pump and apparatus booster tank wafer type check valves shall be installed in the water pump discharge piping prior to the foam injection point.

Y\_\_\_\_ N\_\_\_\_

## **FLOWMETER**

A paddlewheel type flow meter shall monitor water flow in foam capable discharges. The flow meter body shall be constructed of bronze and the sensor assembly shall be locked into the tee with a pin and screw on cap. The flow meter shall have a 500 PSIG (34 BAR) pressure rating per NFPA requirements.

One (1) flow meter is required for proper operation of the foam proportioning system. Power for the flow meter sensor shall be provided through the electrically shielded cable set from the control unit. Flow meters having NPT threaded and Victaulic connections shall be used in the water discharge piping.

The flow meter selected shall be sized to adequately monitor the minimum and maximum flow expected in the foam capable discharges.

Y\_\_\_\_ N\_\_\_\_

## **CONTROL CABLES**

The cables for connection of the control unit, distribution box, flow meter sensor, flow meter display units, pressure transducers and feedback sensor shall be 100% electrically shielded molded male by female cordsets. The cordsets shall have the ability to connect together and total length shall not exceed 40 feet (12 meters). The connections shall be keyed to prevent mis-connection and improper system operation. Shielding shall be provided by an aluminized mylar shield within the PVC outer jacket. A drain wire shall be tied to one of the pins on each end of the cable. No externally attached ferrite beads shall be installed for the purpose of electrical shielding. Coupling nuts on the cordset ends shall be constructed of nickel coated brass. When properly connected the connections shall be sealed to NEMA 4X or equal.

Y\_\_\_\_ N\_\_\_\_

## **LOW TANK LEVEL SWITCH**

One low tank level switches shall be installed in each foam concentrate tank. The low tank level sensors shall be connected to the foam proportioning system to provide protection against dry running of the foam pump. The low tank level sensor shall be mounted on the side of the foam concentrate tank. The low tank level sensor and electrical connections shall be sealed to prevent infusion of foam concentrate into the wiring and possible short circuit of the tank level sensor.

Y\_\_\_\_ N\_\_\_\_

## **FOAM SUPPLY**

The foam proportioning system shall be supplied from separate apparatus mounted foam concentrate storage tanks. The tanks shall be constructed of materials compatible with foam concentrates being used in the system. Provision shall be made for installation of low tank level sensors and routing of the wiring for the sensors. Tank capacity, venting, fill opening and foam outlet plumbing connections shall be in accordance with NFPA requirements.

Y\_\_\_\_ N\_\_\_\_

## **DOCUMENTATION**

The foam proportioning system when delivered to the end user shall include a foam concentrate compatibility list and two (2) Description, Installation and Operation Manuals. The foam proportioning system shall have a one (1) year limited manufacturer's warranty.

Y\_\_\_\_ N\_\_\_\_

## FOAM SYSTEM

The foam system will operate as a Class A and B system.

Y\_\_\_\_ N\_\_\_\_

## TANK FOAM TANK REFILL SYSTEM

Two (2) truck mounted 12-volt foam tank refill systems shall be provided and installed on the apparatus. The refill systems shall provide the ability to automatically refill the foam tanks from the ground without carrying foam solution up to the foam cells in the hosebed.

Each refill system shall be activated by an on/off rocker switch provided on a control panel installed on the pump panel. The foam refill system will automatically shut off when the foam tank is full. The refill system quick connection shall be located beneath the pump panel running board to prevent foam from spilling onto the running board during connection operations.

System features:

- Weather proof on/of rocker switch with integral green power on indicator light
- Red refill PUMP ON indicator light
- Automatic tank fill shutoff, vertical or side mount float switches
- Thermally protected 12-volt motor
- Relay operated motor power circuit
- 5 gpm capacity @ 8 foot lift
- Self priming pump, can run dry and re-prime itself automatically
- Composite pump head with Buna-N diaphragm
- All corrosion resistant components
- Compatible with Class A or Class B foam concentrates
- Quick connect inlet hose with wand
- Suction inlet strainer

Y\_\_\_\_ N\_\_\_\_

## **FOAM SYSTEM OUTLETS**

The foam system shall be distributed into the following discharge outlets:

Two (2) 1-1/2" crosslay discharges.

One (1) front jumpline discharge.

Y\_\_\_\_ N\_\_\_\_

## **FOAM SYSTEM CONTROLS**

The system shall be equipped with an electronic control unit, suitable for installation on the pump operator panel as the single point of operation for the foam proportioning system. Incorporated within the control unit shall be a microprocessor that receives input from water flow meter while receiving foam concentrate pump output information from the foam concentrate flow meter. The microprocessor, through constant comparison of the flow signals, shall ensure the operator preset proportional amount of foam concentrate is injected into the discharge stream of the fire pump. The electronic control unit shall permit the pump operator to perform the following control and operation functions for the foam proportioning system:

Provide push-button ON/OFF control of foam proportioning system.

Provide push-button control of foam proportioning rates from 0.1% to 10.0% (1.0% on a 2.1A and 3.3 systems), in 0.1% increments.

Show real time flow rate of water or foam solution.

Show total volume of water or foam solution discharged during and after foam operations.

Show foam concentrate injection rate.

Show total amount of foam concentrate consumed.

Permit resetting of totalized values for water and foam concentrate.

Simulate water flow rates for manual operation, calibration and testing of foam system.

Enable system setup and full range system diagnostic functions.

Indicate on LED bargraph foam concentrate is being injected and the foam system capacity.

Indicate on LED bargraph when system capacity is not within design parameters.

Store independent default values for Class A foam concentrate injection.

Flash a "low concentrate" warning when the foam concentrate tank runs low.

Flash a "no concentrate" warning and shut the system off when the foam tank is empty.

Flash a "low battery" warning when battery voltage is low enough to affect system operation.

Flash a "hot" warning when system is running hot due to low voltage or radiant heat.

A distribution box shall be attached to the base plate to provide ease of installation. The distribution box shall be sealed to a NEMA 4X or equal rating to permit installation in the pump compartment. Foam concentrate flow feedback shall be provided to the control unit through the distribution box by a sensor mounted in the foam pump body. Rotors in the foam discharge side of the foam pump shall provide the targets to pulse the sensor to generate a feedback signal.

The distribution box shall receive 12 volt direct current power from the apparatus electrical system as the only source of power to operate the system and power component sensors. Control power shall be distributed to the control unit, flow meter sensor and foam concentrate feedback sensor through a conductor in the 100% electrically shielded cable sets provided by the foam proportioner manufacturer. The microprocessor in the control unit shall process input signals from the flow meter sensor and foam feedback sensor to determine the proper duty cycle for the electric motor to run. The distribution box shall provide power to the electric motor, based on signals received from the control unit, at a variable rate to ensure that the correct proportion of foam concentrate, preset by the pump operator on the control unit, is injected into the water pump discharge stream. The distribution box shall have a main power control switch and over current protection for the foam proportioning system. All primary electrical wires for the foam concentrate system shall be type SXL or GXL (SAE J1128) per NFPA requirements. Electrical connections shall be made using heavy duty 5/16 inch diameter studs and nuts.

Y\_\_\_\_ N\_\_\_\_

## **HYDRAULIC GENERATOR**

The generator shall be one (1) Harrison MCR Hydraulic Driven Generator rated at 8,000 watts, 68/34 amps, 120/240VAC, 60Hz, 1-phase.

The generator shall use a structural steel frame which affords protection to the components and provides a unitized mounting module. The top of the module shall have a NFPA approved diamond tread plate cover.

The generator shall use a Self-Sealing Air Intake to prevent recirculation of exhaust air. A Twin Draft Air Duct for the alternator and heat exchanger; located on the same side of the generator shall be integrated with Dual-Fan Technology for cooling.

The generator shall use an industrial type alternator with heavy-duty bearings and a brushless design. The generator shall use a meter to monitor the frequency, voltage and amperage of each leg.

The generator shall be capable of being used while vehicle is either stationary or in motion.

The body of the generator tray assembly (including reservoir) shall be 38" long x 14" wide x 18,13" high, weighing approximately 247 pounds. The hydraulic pump shall be driven by a chassis transmission mounted power take off (PTO).

### **Ratings and Capacity**

Rating: 8000 watts continuous

Volts: 120/240 volts  
Phase: Single  
Frequency: 60 Hz  
Amperage: 68 amps @ 120 volts or 34 amps @ 240 volts  
Engine speed at engagement: Standard soft start feature allows for any speed engagement  
Operation range: 880 to 3120 RPM

The generator shall be warranted by the manufacturer for a period of not less than two (2) years or 2000 hours, whichever should come first.

Y\_\_\_ N\_\_\_

**TESTING**

The generator shall be tested in accordance with all current NFPA 1901 standards.

Y\_\_\_ N\_\_\_

**MOUNTING LOCATION**

The generator unit shall be mounted in the dunnage compartment.

Y\_\_\_ N\_\_\_

**POWER TAKE OFF**

A "Hot Shift" PTO unit shall be provided and installed. A switch to control the operation of the PTO shall be installed in the cab in a location convenient to the driver.

Y\_\_\_ N\_\_\_

**120/240-VOLT AC NFPA LOAD TEST**

**Electrical System Testing.**

The wiring and associated equipment shall be tested by the apparatus manufacturer or the installer of the line voltage system.

The wiring and permanently connected devices and equipment shall be subjected to a dielectric voltage withstand test of 900 volts for 1 minute. The test shall be conducted between live parts and the neutral conductor, and between live parts and the vehicle frame with any switches in the circuit(s) closed. This test shall be conducted after all body work has been completed. The dielectric tester shall have a 500 volt-amperes (VA) or larger transformer, with a sinusoidal output voltage that can be verified.

Electrical polarity verification shall be made of all permanently wired equipment and receptacles in order to determine that connections have been properly made.

Y\_\_\_ N\_\_\_

**Operational Test**

The apparatus manufacturer shall perform the following operational test and shall certify that the power source and any

devices that are attached to the line voltage electrical systems are properly connected and in working order as per NFPA 1901-22.15.7.3.

The prime mover shall be started from a cold start condition and the line voltage electrical system loaded to 100 percent of the nameplate rating.

The following information shall be recorded:

- (1) The cranking time until the prime mover starts and runs, if applicable
- (2) The voltage, frequency, and amperes at continuous full rated load
- (3) The prime mover oil pressure, water temperature, transmission temperature, hydraulic temperature, and the battery charge rate, as applicable
- (4) The ambient temperature and altitude

The power source shall be operated by the apparatus manufacturer at 100 percent of the systems continuous rated wattage as specified on the Power Source Specification Label for a minimum of 2 hours. Testing with a resistive load bank shall be permitted. The conditions specified in 22.15.7.3.4.2 shall be recorded at least every 1/2 hour during the test.

If the apparatus is equipped with a fire pump, this 2-hour test shall be completed with the fire pump pumping at 100 percent capacity at 150-psi (1035 kPa) net pump pressure. The 2-hour test shall be permitted to be run concurrently with the pump certification test required in 14-13.1.

Where the line voltage power is derived from the vehicles low-voltage system, the minimum continuous electrical load as defined in Chapter 11 shall be applied to the low-voltage electrical system during the operational test. Any termination of line voltage power by the low-voltage load management system shall be noted, and the duration of the periods of line voltage power source shutdown shall be recorded.

Vehicle support systems that are required to maintain the power source in operation shall remain within their required operational parameters.

The results of the tests listed in this section shall be supplied to the purchaser at the time of delivery.

Y\_\_\_\_ N\_\_\_\_

### **LOAD CENTER PANEL**

A Square D Homeline circuit breaker panel shall be provided in the apparatus body. All breakers shall be properly labeled. The generator shall be hard wired to the circuit breaker panel. The circuit breaker panel shall be mounted so as to not interfere with shelves or trays, if specified. The load center panel cover shall be accessible with hand tools.

The load center panel mounting location shall be in the L1 compartment.

Y\_\_\_\_ N\_\_\_\_

### **WEATHER RESISTANT TUBING**

The AC wiring in the apparatus body shall be installed in seal-tite weather resistant conduit.

Y\_\_\_\_ N\_\_\_\_

### **CIRCUIT BREAKERS**

Manual reset 120-volt AC circuit breakers shall be provided in the load center as required by the circuits installed by the apparatus manufacturer.

Y\_\_\_\_ N\_\_\_\_

**CIRCUIT BREAKERS**

Manual reset 240-volt AC circuit breakers shall be provided in the load center as required by the circuits installed by the apparatus manufacturer.

Y\_\_\_ N\_\_\_

**120 VOLT RECEPTACLE**

One (1) 120-volt AC, single receptacle shall be provided with a weatherproof cover on the left side wheel well area of the apparatus body.

The electrical outlet shall be a NEMA 5-15, rated at 120-volt AC, 15-amp, single straight blade receptacle.

Y\_\_\_ N\_\_\_

**120 VOLT RECEPTACLE**

One (1) 120-volt AC single receptacle shall be provided with a weatherproof cover on the right side wheel well area of the apparatus body.

The electrical outlet shall be a NEMA 5-15, rated at 120-volt AC, 15-amp, single straight blade receptacle.

Y\_\_\_ N\_\_\_

**120 VOLT RECEPTACLE**

One (1) 120-volt AC receptacle shall be provided with a weatherproof cover on the rear of apparatus body.

The electrical outlet shall be a NEMA 5-15, rated at 120-volt AC, 15-amp, duplex straight blade receptacle.

Y\_\_\_ N\_\_\_

**ELECTRIC CORD REEL**

One (1) Hannay model ECR1616-17-18 electric rewind cord reel(s) shall be supplied and installed. The reel shall be capable of holding the following:

12/3	10/3	12/4	10/4
200'	150'	150'	150'

The cable reel(s) shall be a 12-volt electric rewind type.

The cord reel shall be equipped with a Hannay SR-50 control to provide a 50% reduction in motor speed.

Y\_\_\_ N\_\_\_

**ELECTRICAL CORD**

Two hundred feet (200') of 12/3 SO (black) cord shall be installed on one (1) reel(s), complete with an HS-3 ball stop.

Y\_\_\_ N\_\_\_

**ELECTRICAL CORD TERMINATION**

The cord reel wiring shall terminate with a NEMA L5-15R, 15 amp twistlock female receptacle.

Y\_\_\_\_ N\_\_\_\_

### **JUNCTION BOX**

There shall be a one (1) foot long power inlet cord on the junction box terminated with a L5-15P connection to mate with the cord reel receptacle.

Y\_\_\_\_ N\_\_\_\_

### **ELECTRICAL CORD JUNCTION BOX**

One (1) Akron junction box, model EJB shall be provided. The junction box is to be powder coated safety yellow and be provided with rubber feet on the bottom of the box.

One (1) Akron yellow powder coated mounting bracket, model EJB-VMT is to be shipped loose with the apparatus for final installation by the department.

The outlet in Location 1 is to be a

Duplex 5-15 125 Volt AC straight blade outlet with spring loaded cover.

The outlet in Location 2 is to be a

Duplex 5-15 125 Volt AC straight blade outlet with spring loaded cover.

The outlet in Location 3 is to be a

Duplex 5-15 125 Volt AC straight blade outlet with spring loaded cover.

The outlet in Location 4 is to be a

Duplex 5-15 125 Volt AC straight blade outlet with spring loaded cover.

Y\_\_\_\_ N\_\_\_\_

### **CAPTIVE ROLLERS**

There shall be a captive roller system furnished for the cord reel. The roller assembly shall be mounted on the dunnage side wall. If the body selection requires ladders on beam the right side cord reel is elevated and the rollers are mounted on the cord reel assembly.

Y\_\_\_\_ N\_\_\_\_

### **REEL REWIND SWITCH**

The cord reel shall be equipped with a weather resistant push button switch mounted on the side of the pump module.

Y\_\_\_\_ N\_\_\_\_

### **ELKHART BALL VALVES**

All discharge ball valves shall be manual control 1/4 turn Elkhart heavy duty swing out valve with stainless steel ball unless specified otherwise.

Y\_\_\_\_ N\_\_\_\_

### **TANK TO PUMP**

The tank to pump piping shall be capable of delivering water to the pump at a rate of five hundred (500) gallons per minute. This flow shall be sustained while pumping to a minimum of 80% of the certified tank capacity with the apparatus on level ground.

The tank to pump line shall run from the pump to the front face of the water tank and down into the tank sump. A rubber coupling shall be included in this line to prevent damage from vibration or chassis flexing. The tank to pump line shall be 3" I.D. piping with a 3" ball valve.

Y\_\_\_\_ N\_\_\_\_

### **TANK REFILL**

A 1-1/2" tank refill line shall be provided using a quarter-turn full flow ball valve controlled from the pump operator's panel with a manual locking handle. The tank refill shall be plumbed with high pressure flexible piping and high pressure flexible piping stainless steel couplings.

Y\_\_\_\_ N\_\_\_\_

### **HEAT EXCHANGER DISCHARGE**

A gated discharge line shall be installed to provide water from the fire pump to the chassis supplied heat exchanger to assist in engine cooling during pumping operations. The heat exchanger line shall be controlled at the pump operator's panel with a Class 1 valve.

Y\_\_\_\_ N\_\_\_\_

### **WATER TANK CONSTRUCTION**

The tank shall have a rated capacity in U.S. gallons, complete with lifetime warranty. The tank manufacturer shall mark the tank and furnish notice that indicates proof of warranty. The purpose of the notice is to inform department personnel who store or use the tank that the unit is under warranty.

The tank shall be constructed of 1/2" thick Polyprene & Mac226 sheet stock. This material shall be non-corrosive stress relieved thermoplastic, white in color and UV stabilized for maximum protection. The tank shall be of a special configuration and is so designed to be completely independent of the body and compartments. All exterior tank joints and seems shall be extrusion welded and/or contain the Bent Edge™ and tested for maximum strength and integrity. The top of the tank is fitted with removable lifting eyes designed with a 3-to-1 safety factor to facilitate easy removal.

The transverse and longitudinal swash partitions shall be manufactured of Polyprene & Mac226 material. All partitions shall be equipped with vent and air holes to permit movement of air and water between compartments. The partitions shall be designed to provide maximum water flow and meet NFPA rules. All swash partitions interlock with one another and are welded to each other as well as to the walls and floor of the tank.

Y\_\_\_\_ N\_\_\_\_

### **EXTERNAL FOAM TANKS**

Two ten (10) gallon polypropylene foam concentrate tank shall be furnished as an external component of the booster tank. The foam tank shall have an anti-foaming fill stack and removable screen located in an accessible area. The foam tank fill tower shall be equipped with a latch, pressure/vacuum vent and have a sealed airtight cover.

The foam tanks shall be plumbed to the on board "Class A and B" foam system. A drain valve shall be provided at the

lowest point of the foam tank. The foam tanks shall drain shall directly to the surface below the apparatus without contacting other body or chassis components. The following labels shall be attached to the foam tanks:

"CLASS A FOAM TANK FILL"

"WARNING: DO NOT MIX BRANDS AND TYPES OF FOAM"

"CLASS B FOAM TANK FILL"

"WARNING: DO NOT MIX BRANDS AND TYPES OF FOAM"

Y\_\_\_ N\_\_\_

### **TANK SUMP AND CONNECTIONS**

There shall be one (1) sump standard per tank. The sump shall be constructed of white Polyprene & Mac226 and be located in the left front corner of the tank, unless specified otherwise. On all tanks that require a front suction, a schedule 40 polypropylene pipe shall be installed that will incorporate a dip tube from the front of the tank to the sump location. The sump shall have a minimum 3" FNPT threaded outlet on the bottom for a drain plug. This shall be used as a combination clean out and drain. All tanks shall have an anti-swirl plate located above the dip tube.

There will be two (2) standard tank outlets: one for tank to sump suction line, and one for a tank fill line. All tank fill couplings shall be backed with flow deflectors to break up the stream of water entering the tank, and be capable of withstanding sustained fill rates of up to 1,000 GPM. The addition of rear suction fittings, nurse valve fittings, dump valve fittings, and through tank sleeves to accommodate rear discharge piping must be specified. All auxiliary outlets and inlets must meet NFPA 1901 guidelines in effect at the time of manufacture.

Y\_\_\_ N\_\_\_

### **TANK MOUNTING**

The tank shall be mounted on the aerial torque box and shall be insulated from the torque box with hard rubber insulators. The tank shall be designed on the free-floating suspension principal and shall not require the use of hold downs. The tank shall be completely removable without disturbing or dismantling the apparatus body structure.

Y\_\_\_ N\_\_\_

### **PURCHASE INTENT**

The apparatus being purchased is expected to have a 20 year service life. Based on this requirement, the department is extremely concerned that the apparatus remains structurally sound and the outward appearance remains in a "like new" condition, with minimal maintenance and upkeep, throughout the service life of the apparatus. Aluminum apparatus bodies and differing construction designs will be reviewed and considered only if the builder / manufacture will meet the same "Body Structural Warranty" requirements specified in this bid document. Regardless of materials used or design, the entire body design shall be of a bolted design to allow for ease of removal for repair or replacement, without cutting welds.

Y\_\_\_ N\_\_\_

### **APPARATUS BODY DESIGN AND CONSTRUCTION**

The apparatus body shall be built of stainless steel and shall be designed for Fire Service use only. The overall body width shall be 100" and shall be constructed in accordance with current NFPA requirements. All metal work shall be free of sharp edges, objects or corners. No exceptions will be permitted to this requirement.

The pump module is to be completely separate from the main body to prevent damage due to flexing. The entire apparatus body shall be precision machine fabricated bolted construction, properly reinforced with integral flanges, eliminating the need for additional structural shapes. Hose body fabrications shall be free of all projections which might injure personnel or

fire hose.

Stainless recessed round head bolts and stainless aircraft style "ESNA" nuts shall be applied with torque wrench set with proper torque rating for each fastener. This type of construction shall greatly enhance the strength, ease of parts replacement in the event of damage, and future modifications. Wherever possible, body bolts shall be hidden from plain view for appearance and ease of apparatus cleaning.

The body design shall be fully tested with proven engineering and test techniques such as finite element analysis, stress coating, and strain gauging shall have been performed with special attention given to fatigue life and structural integrity of compartments and body support system. All welding of body support system shall be accomplished by welders certified to the standards of the American Welding Society for the metals being used.

Y\_\_\_\_ N\_\_\_\_

### **FRONT OF BODY CONSTRUCTION**

Front body support system shall be an integral design with .250" thick steel deep section cross member cross the top of the chassis frame. The deep section cross member shall be attached to the right side and the left side 10-gauge lower front compartment weldments with eight (8) Grade 8 .375" diameter bolts on each side of the apparatus. The front cross member shall be attached to the chassis by means of spring mounting system with limited travel.

The lower portion of this spring mounting system shall be a integral part of the console outriggers. This design allows for maximum chassis flexing without undue stress transfer to the apparatus body. The front vertical corners of the apparatus body shall be recessed to provide a mounting area for vertical hand rails and telescoping light poles.

Y\_\_\_\_ N\_\_\_\_

### **REAR OF BODY CONSTRUCTION**

Rear body crossmember support system shall consist of a interwoven dual .625" thick steel drop frame attachments, a transverse 4" x 3" x .375" thick structural channel, and dual laminated .188" thick rear compartment and tailboard support tapered angles on each side of apparatus. The right and left side rear 10-gauge compartments shall be attached to the rear body support to form a modular integral body support system.

Y\_\_\_\_ N\_\_\_\_

### **TOP OF BODY CONSTRUCTION**

The upper body shall be constructed of 12 and 14-gauge prime stainless steel. Interior and unexposed stainless steel parts shall be #2B finish and exterior parts stainless steel parts that are visible shall have #4B finish. For added strength the top of the side body panels shall be triple flanged out 2" and down 1".

Y\_\_\_\_ N\_\_\_\_

### **MODULAR BODY REQUIREMENTS**

The body shall be completely modular in design allowing transfer of body components to a new chassis in the event of a accident or wear. Body components shall be removable from chassis without cutting or bending. The modular design shall also facilitate ease of repair or replacement of major or minor body parts. All body panels are to be laser cut on a CAM controlled laser to ensure accuracy (+/.010") this shall greatly enhance assembly and matching of repair parts.

A full length diamond plate aluminum cap shall be provided on the upper left side of the apparatus body. The diamond plate cap shall wrap the outer edges of the body, with a 3" vertical lip and shall extend 25" inward to the torque box. The top surface of the torque box shall be covered with bolt on diamond plate covers.

The sub-frame shall be bolted to the chassis frame utilizing 2" certified Grade 8 bolts. A minimum of four (4) bolts shall be used per sub-member. There shall be no welding of components to the chassis frame. The entire body shall be fabricated

using precision holding fixtures to ensure accurate dimensions. The body assembly shall be securely bolted to the sub-frame utilizing steel, certified Grade 8 bolts. Major body components shall consist of right and left body sides, and rear facing compartments.

The front and rear vertical corners of the apparatus body shall be recessed to provide a mounting area for vertical hand rails and telescoping light poles. Two (2) handrails shall be provided at the left and right sides of the apparatus body mounted vertically. A full width handrail shall be mounted at the rear of the body below the hosebed.

Y\_\_\_\_ N\_\_\_\_

### **COMPARTMENT INTERIOR FINISH**

For better interior visibility, to reflect light better, ease of maintenance and prevent the masking of poor welds and questionable workmanship the interior of the body compartments shall remain uncoated.

Y\_\_\_\_ N\_\_\_\_

### **EXTERIOR ROOF FINISH**

The top of the compartments shall be brushed stainless steel. The roof shall contain 'Not a Stepping Surface' labeling.

Y\_\_\_\_ N\_\_\_\_

### **COMPARTMENT DESIGN AND CONSTRUCTION**

All compartments shall be manufactured from 12-gauge stainless steel with the vertical front and rear corner walls from 14-gauge, shall be of sweep out design and shall be bolted together. Stainless recessed round head bolts and stainless aircraft style "ESNA" nuts shall be applied with proper torque rating for each fastener. This type of construction shall greatly enhance the strength and ease of parts replacement in the event of damage and future modifications. Wherever possible, body bolts shall be hidden from plain view for appearance and ease of apparatus cleaning.

Y\_\_\_\_ N\_\_\_\_

### **COMPARTMENT VENTILATION**

Each compartment shall be provided with a laser cut louver to provide adequate ventilation.

Y\_\_\_\_ N\_\_\_\_

### **WATER TANK CAPACITY**

The water tank shall be rectangular in shape and shall have a maximum capacity of 400 US gallons.

Y\_\_\_\_ N\_\_\_\_

### **TANK LID & FILL TOWER**

The tank shall have a combination vent and fill tower. The fill tower shall be constructed of 1/2" thick Polyprene & Mac226 and shall be a minimum dimension of 10"x 14" outer perimeter. The tower shall be located in the center front of the tank unless otherwise specified by the purchaser. The tower shall have a 1/4" thick removable Polyprene & Mac226; screen and a Polyprene & Mac226 hinged-type cover. Inside the fill tower, there shall be a combination vent overflow pipe. The vent overflow shall be a minimum of schedule 40 pipe with a minimum ID of 4" that is designed to run through the tank, and shall be piped behind the rear axle beneath the tank.

The tank cover shall be constructed of recessed 1/2" thick Polyprene & Mac226, stress relieved, UV stabilized material. A minimum of two lifting dowels shall be drilled and tapped to accommodate the lifting eyes.

Y\_\_\_\_ N\_\_\_\_

### **OVERFLOW AND VENT PIPE**

The fill tower shall be fitted with an integral 4" ID, Schedule 40 PVC combination overflow/vent pipe running from the fill tower through the tank to a 4" coupling flush mounted into the bottom of the tank to allow water to overflow beneath the chassis.

The water tank manufacturer shall be either APR or UPF selected by the apparatus builder.

Y\_\_\_\_ N\_\_\_\_

### **LONGITUDINAL APPARATUS BODY HOSEBED**

There shall be a longitudinal hosebed furnished above the exterior right side lower body side compartments. The hosebed shall be constructed in such a manner that shall prevent damage to fire hose. The hosebed shall comply with the current NFPA requirements. The interior of the hosebed shall be free of projections such as nuts, sharp edges or brackets that may damage hose. The hosebed and walls shall be manufactured from stainless steel. No exceptions to this requirement are allowed.

An aluminum extrusion shall be installed over the rear opening of the hosebed to protect the body from wear. The hosebed bottom shall be fitted with removable slatted, ribbed 6" heavy-duty extruded aluminum floorboards.

Y\_\_\_\_ N\_\_\_\_

### **ADJUSTABLE HOSE BED DIVIDERS**

One (1) adjustable hosebed dividers shall be provided. Each divider shall be fabricated from .250" thick smooth aluminum plate, 5052-H32 alloy. The rear end of each divider shall have a 3" radius corner and shall be sanded and deburred to prevent damage to hose.

There shall be two hand hold openings provided. One (1) at the rear in a vertical position and one (1) approximately 24 inches in from the rear in a horizontal position.

Y\_\_\_\_ N\_\_\_\_

### **HINGED ALUMINUM HOSEBED COVER**

A one-piece polished aluminum treadplate hosebed cover shall be supplied and shall extend the full length and width of the main hosebed. The hosebed cover shall be constructed of .125" polished aluminum treadplate with cross bracing to provide maximum strength and rigidity to support the weight of a firefighter standing on the cover when closed. The aluminum treadplate shall meet the current revision of NFPA 1901 for step requirements.

The cover shall be equipped with a full length stainless steel piano hinge and chrome plated grab handles at the front and rear of the cover. The hosebed cover shall include a heavy duty stop to support it when placed in the open position.

Y\_\_\_\_ N\_\_\_\_

### **REAR VINYL FLAPS FOR ALUMINUM COVER**

There shall be one (1) black vinyl flap attached to each aluminum hosebed cover. The vinyl flaps shall cover the area at the rear of the hosebed from top to bottom. The flaps shall be independent of each other and shall be attached with Velcro fastenings. The bottom edge of each flap shall be weighted and also have an eyelet on each outer corner.

The hosebed cover rear flap shall have a positive locking device to meet the requirements of NFPA.

Y\_\_\_\_ N\_\_\_\_

### **LEFT SIDE COMPARTMENT DIMENSIONS**

#### **FORWARD OF WHEEL WELL**

There shall be one (1) rescue style, full height, and full depth compartment ahead of the rear wheels. It shall have approximate dimensions of 75" wide x 63" high x 24" deep.

Y\_\_\_\_ N\_\_\_\_

#### **ABOVE WHEEL WELL**

There shall be one (1) high side full depth compartment centered over the rear wheels. It shall have approximate dimensions of 81" wide x 33" high x 24" deep.

Y\_\_\_\_ N\_\_\_\_

#### **REAR OF WHEEL WELL**

There shall be one (1) rescue style, full height, and full depth compartment behind the rear wheels. It shall have approximate dimensions of 25" wide x 63" high x 24" deep.

Y\_\_\_\_ N\_\_\_\_

### **ROLLUP DOOR CONSTRUCTION - LEFT SIDE**

All left side compartments shall be provided with Gortite roll up doors. The roll up doors shall be constructed of double sided aluminum extrusions connected with a ball and socket joint. The extrusions shall be 1-3/8" wide x 3/8" thick and shall be painted to match the job color. A flexible EDPM extrusion shall be provided between each slat to insure a weather tight seal. Aluminum extrusions shall be individually replaceable without disassembling the entire door by removing push out clips on each end.

Side channels for each door to ride in shall be provided with santoprene seals to prevent dirt and moisture from entering the exterior compartment. A single piece top drip rail shall be provided with a santoprene seal to prevent dirt and moisture from entering the compartment when the door is fully closed. The bottom of each door shall also be provided with a santoprene seal. All nonmetallic parts shall be glass filled nylon.

The doors shall be painted to match the main job color.

The left side door latches shall be non-locking stainless steel lift bars and shall be provided with a magnetic door ajar switch system.

Y\_\_\_\_ N\_\_\_\_

### **FENDER SIDE SKIRTS**

There shall be stainless steel fender side skirts located in the area of the rear wheels. The design of the fender sides shall be a minimal length to provide maximum compartment space in the apparatus.

Y\_\_\_\_ N\_\_\_\_

### **FUEL FILL - REAR BODY**

The fuel fill shall be located in the rear on the left side of the apparatus body. The spring loaded fuel fill door shall have

"Diesel Fuel" laser cut in the face of the door. There shall be a vent line from the fuel tank to beneath the fuel cap to aid in fueling of the truck.

Y\_\_\_\_ N\_\_\_\_

**BODY FENDERS - POLISHED**

The apparatus body fenders shall be made from 16 gauge polished stainless steel and shall be rolled, die stamped and fully removable. The stainless steel fenders and stainless fender liners shall be fastened with stainless bolts and ESNA nuts to the outer fender panel.

Y\_\_\_\_ N\_\_\_\_

**REAR AXLE MUD FLAPS**

Two (2) black, anti-sail, mud flaps shall be mounted behind the rear wheels.

Y\_\_\_\_ N\_\_\_\_

**SCBA BOTTLE COMPARTMENTS**

Four (4) SCBA bottle tube compartments shall be provided, two (2) in each side rear wheel well area. Each compartment shall be constructed of gray roto molded storage compartment to provide SCBA scuff protection. A door seal shall be provided at the perimeter of the SCBA compartment. The doors shall be brushed stainless steel with a push button trigger latch.

Y\_\_\_\_ N\_\_\_\_

**SCBA BOTTLE RETENTION STRAP**

One (1) one-inch (1") wide loop of red webbing shall be installed in each SCBA compartment to prevent the bottle from sliding out of the compartment in the event the door is not latched for travel. The loop shall be mounted, centered in the compartment and shall hang within one-inch (1") of the compartment floor to allow the bottle to pass by the strap when the bottle is placed in the compartment. The strap shall loop over the valve.

Y\_\_\_\_ N\_\_\_\_

**RIGHT SIDE COMPARTMENT DIMENSIONS**

**FORWARD OF WHEEL WELL**

There shall be one (1) high side full depth compartment ahead of the rear wheels. It shall have approximate dimensions of 55" wide x 33" high x 24" deep.

There shall be one (1) low side full depth compartment ahead of the rear wheels. It shall have approximate dimensions of 75" wide x 30" high x 24" deep.

Y\_\_\_\_ N\_\_\_\_

**REAR OF WHEEL WELL**

There shall be one (1) low side full depth compartment behind the rear wheels. It shall have approximate dimensions of 46" wide x 30" high x 24" deep.

Y\_\_\_\_ N\_\_\_\_

**ROLLUP DOOR CONSTRUCTION - RIGHT SIDE**

All right side compartments shall be provided with Gortite roll up doors. The roll up doors shall be constructed of double sided aluminum extrusions connected with a ball and socket joint. The extrusions shall be 1-3/8" wide x 3/8" thick and shall be painted to match the job color. A flexible EDPM extrusion shall be provided between each slat to insure a weather tight seal. Aluminum extrusions shall be individually replaceable without disassembling the entire door by removing push out clips on each end.

Side channels for each door to ride in shall be provided with santoprene seals to prevent dirt and moisture from entering the exterior compartment. A single piece top drip rail shall be provided with a santoprene seal to prevent dirt and moisture from entering the compartment when the door is fully closed. The bottom of each door shall also be provided with a santoprene seal. All nonmetallic parts shall be glass filled nylon.

The doors shall be painted to match the main job color.

The right side door latches shall be non-locking stainless steel lift bars and shall be provided with a magnetic door ajar switch system.

Y\_\_\_\_ N\_\_\_\_

**LADDER STORAGE COMPARTMENT**

The aerial torque box shall have a rear opening for ladder storage inside the apparatus body. This compartment shall extend from the rear of the torque box to allow the ladders to extend into the torque box for storage. The compartment shall have approximate dimensions of 27" high x 43" wide.

Y\_\_\_\_ N\_\_\_\_

**HINGED DOOR CONSTRUCTION - REAR**

The rear ladder storage compartment shall be provided with hinged doors. The hinged compartment doors shall be the style so that the entire door fits flush against the apparatus body sides. All doors shall be provided with a high quality, double seal type weather stripping to prevent moisture and dust from entering the exterior compartments. No exceptions are allowed to this requirement.

Each door shall be double pan design with the outer door material being stainless steel with a stainless inner liner that shall have a natural finish to provide reflective qualities during night operations.

The rear doors shall have gas shocks. A polished stainless steel 1/4" piano hinge shall be provided for each door.

The right side door latches shall be Hansen slam latches, with a chrome "D" ring with a 5-degree bend for easier grasping of each door handle with gloved hands.

Y\_\_\_\_ N\_\_\_\_

**REAR BODY REFLECTIVE CHEVRON STRIPING**

At least 50% of rear-facing vertical surfaces of the rear rear body area, visible from the rear of the apparatus, including the rear ladder compartment door, shall be equipped with six (6) inch wide retroreflective striping in a chevron pattern sloping downward and away from the centerline of the vehicle at an angle of 45 degrees.

Each stripe in the chevron shall be a single color alternating between red (3M #-82) and yellow (3M #-81).

Y\_\_\_\_ N\_\_\_\_

**BODY RUBRAIL**

The apparatus body shall have a bolt on extruded, aluminum rub rail affixed to both sides beneath each door area. The rub rail shall provide additional strength and protection and shall be constructed aluminum fastened with stainless steel fasteners. Each rub rail shall be attached to the apparatus body with standoff spacers made from 1" diameter UHMW Polyethylene bar stock.

The rub rail shall incorporate white LED lights to provide ground illumination and red LED lights to provide additional emergency warning. The LED light shall be protected within the within the rub rail extrusion. The rail shall incorporate a red and white alternating reflective center area. The white lights shall illuminate when the parking brake is set and the apparatus is running with the master battery switch in the "ON" position

Y\_\_\_\_ N\_\_\_\_

### **STAINLESS STEEL APPARATUS BODY PAINTED**

The following apparatus body components shall be painted job color.

The rear wheel fender panels

The exterior surface of the hosebed side walls / coffin compartment

Y\_\_\_\_ N\_\_\_\_

### **APPARATUS PAINT WARRANTY**

The manufacturer shall provide a limited parts and labor warranty to the original purchaser of the custom built apparatus for a period of sixty (60) months. The warranty period shall commence on the date the vehicle is delivered to the end user. The warranty shall include conditional items listed in the detailed warranty document which shall be provided upon request.

Y\_\_\_\_ N\_\_\_\_

### **TURNTABLE ACCESS STEPS**

There shall be a recessed egress ladder furnished on the left rear of the body for access to the aerial turntable assembly. The egress ladder shall have non-slip type steps and shall have a full length handrail furnished on each side of the egress ladder to aid in ascending and descending the access steps.

There shall be a specially designed folding step furnished on the bottom of the egress ladder for access to the ladder when the aerial outriggers are set. The folding step shall lock into the stowed position when not in use and not protrude past the body side.

The remaining steps shall have a maximum stepping height not exceeding 18", with the exception of ground to the first step. Each step shall be illuminated with a model 20 light for nighttime operation. The step lights shall be actuated by the parking brake.

Y\_\_\_\_ N\_\_\_\_

### **DUNNAGE COMPARTMENT REAR**

There shall be a dunnage storage box located above ground ladder storage. The dunnage shall be as large as allowed by the available space. The dunnage compartment shall have a hinged cover constructed of aluminum deck plate that is supported by gas lifts springs. The lid shall for a walking surface.

Y\_\_\_\_ N\_\_\_\_

### **EXTERIOR COMPARTMENT LIGHTING**

Two (2) LED strip lights shall be provided for each body compartment. Each body door shall have an automatic compartment light switch.

In addition to the LED strip lights there shall be two (2) 4" round LED lights. The lights shall be mounted in the front wall of compartments L1 and R1. These lights shall illuminate the pump panel area.

Y\_\_\_\_ N\_\_\_\_

### **UNDERBODY LIGHTING**

Underbody ground lights shall be provided under the apparatus body. These ground lights shall be LED strips mounted in armor guards. ..

These lights shall be installed beneath the pump panel running boards one (1) on each side and across the rear step at the back of the body.

Y\_\_\_\_ N\_\_\_\_

### **FOLDING STEPS**

Folding steps shall be provided on the front of the apparatus body. Steps shall be provided and in installed per NFPA requirements.

The folding step(s) shall include an integrated LED light beneath each step. This light shall illuminate when the apparatus ground lights are activated. The bottom of the step and step mounting shall include white reflective material to aide in locating the step when the vehicle ground lights are not activated.

Y\_\_\_\_ N\_\_\_\_

### **REAR TAILBOARD**

A rear tailboard 8" deep shall be provided at the rear from "Laser Grip" stainless steel meeting NFPA 1901 step requirements. The tailboard shall provide protection for the rear body compartments and shall provide mounting for the rear ICC marker lights. It shall be bolted to the rear support structure.

Y\_\_\_\_ N\_\_\_\_

### **REAR HANDRAILS**

One (1) ribbed, 1-1/4" diameter, aluminum handrails with chrome plated stanchions shall be supplied and installed on each side at rear of the apparatus body.

Y\_\_\_\_ N\_\_\_\_

### **REAR TOW EYES**

Two (2) heavy duty fabricated painted steel tow loops shall be provided on the rear of the chassis frame rails extending through the rear of the body below the torque box compartment. The loops shall be manufactured from a minimum of 1-1/4" thick 50,000 psi yield material and shall have a 3" interior diameter hole to allow for the use of a tow chain end hook. The loops shall be attached to the frame rail with a minimum of four (4) Grade 8 fasteners on each loop.

Y\_\_\_\_ N\_\_\_\_

**HOSEBED LED FLOODLIGHT**

One (1) Whelen PFBP12 LED hosebed floodlight shall be mounted at the front right corner of the hosebed. The light shall be controlled from a switch on the lamp head.

Y\_\_\_\_ N\_\_\_\_

**CAB SIDE SCENE LIGHTS**

There shall be side scene lights installed on the side of the cab between the front and rear cab doors on the raised roof section.

The lighting position(s) shall have two (2) Fire Research Spectra model LED900-Q70 surface mount light shall be installed. The light shall be mounted with four (4) screws to a flat surface. It shall be 6 3/4" high by 9" wide and have a profile of less than 1 3/4" beyond the mounting surface. Wiring shall extend from a weatherproof strain relief at the rear of the light.

The light shall have twenty-four (24) white LEDs that generate a rated 7000 lumens at 12 or 24 volts DC. The lens shall redirect the light along the vehicle and out onto the working area. The light housing shall be aluminum with a chrome colored bezel.

The scene lights shall be operated by a switch located in the driver's area of the cab.

Y\_\_\_\_ N\_\_\_\_

**BODY REAR SCENE LIGHTS**

There shall be rear scene lights installed as high as possible on both sides of the rear of the apparatus body.

The lighting position(s) shall have two (2) Fire Research Spectra model LED900-Q70 surface mount light shall be installed. The light shall be mounted with four (4) screws to a flat surface. It shall be 6 3/4" high by 9" wide and have a profile of less than 1 3/4" beyond the mounting surface. Wiring shall extend from a weatherproof strain relief at the rear of the light.

The light shall have twenty-four (24) white LEDs that generate a rated 7000 lumens at 12 or 24 volts DC. The lens shall redirect the light along the vehicle and out onto the working area. The light housing shall be aluminum with a chrome colored bezel.

The rear scene lights shall be operated by a switch located beneath the left rear step. If the scene light is left in the 'ON' position the lights shall automatically turn off when the truck is parking brake is released.

Y\_\_\_\_ N\_\_\_\_

**LEFT FRONT QUARTZ LIGHT**

The following light shall be provided mounted on the left front corner of the body:

Fire Research Spectra LED Scene Light model SPA100-Q20 lamphead shall be provided. The lamphead shall have eighty-four (84) ultra-bright white LEDs, 72 for flood lighting and 12 to provide a spot light beam pattern. It shall operate at 12 volts DC, draw 18 amps, and generate 20,000 lumens of light. The lamphead shall have a unique lens that directs flood lighting onto the work area and focuses the spot light beam into the distance. The lamphead angle of elevation shall be adjustable at a pivot in the mounting arm and the position locked with a round knurled locking knob. The lamphead shall be no more than 5 7/8" high by 14" wide by 3 1/2" deep and have a heat resistant handle. The lamphead and mounting arm shall be powder coated. The LED scene light shall be for fire service use.

Fire Research -ON option switch shall be installed on the lamp head. The weatherproof on-off toggle switch shall be mounted on the lamp head.

One (1) 12-volt, water proof switch(es) shall be located on the pump operator's panel. The switch(es) shall control 12-volt quartz lighting fixture(s) as selected.

The light head shall be mounted on a side mount push up telescopic pole. The light pole shall be anodized aluminum and have a knurled twist lock mechanism to secure the extension pole in position. The extension pole shall rotate 360 degrees. The outer pole shall be a grooved aluminum extrusion and qualify as an NFPA compliant handrail. The pole mounting brackets shall have a 3 1/2" offset. Wiring shall extend from the pole bottom with a 4' retractile cord.

Y\_\_\_\_ N\_\_\_\_

### **RIGHT FRONT QUARTZ LIGHT**

The following light shall be provided mounted on the right front corner of the body:

Fire Research Spectra LED Scene Light model SPA100-Q20 lamphead shall be provided. The lamphead shall have eighty four (84) ultra-bright white LEDs, 72 for flood lighting and 12 to provide a spot light beam pattern. It shall operate at 12 volts DC, draw 18 amps, and generate 20,000 lumens of light. The lamphead shall have a unique lens that directs flood lighting onto the work area and focuses the spot light beam into the distance. The lamphead angle of elevation shall be adjustable at a pivot in the mounting arm and the position locked with a round knurled locking knob. The lamphead shall be no more than 5 7/8" high by 14" wide by 3 1/2" deep and have a heat resistant handle. The lamphead and mounting arm shall be powder coated. The LED scene light shall be for fire service use.

Fire Research -ON option switch shall be installed on the lamp head. The weatherproof on-off toggle switch shall be mounted on the lamp head.

One (1) 12-volt, water proof switch(es) shall be located on the pump operator's panel. The switch(es) shall control 12-volt quartz lighting fixture(s) as selected.

The light head shall be mounted on a side mount push up telescopic pole. The light pole shall be anodized aluminum and have a knurled twist lock mechanism to secure the extension pole in position. The extension pole shall rotate 360 degrees. The outer pole shall be a grooved aluminum extrusion and qualify as an NFPA compliant handrail. The pole mounting brackets shall have a 3 1/2" offset. Wiring shall extend from the pole bottom with a 4' retractile cord.

75' Aerial Ladder Group

Y\_\_\_\_ N\_\_\_\_

### **EXTENSION LADDER**

One (1) 24' two-section Duo-Safety model 900A solid beam, aluminum extension ladder shall be provided with the apparatus.

Y\_\_\_\_ N\_\_\_\_

### **ROOF LADDER**

One (1) 14' Duo-Safety model 775-A, aluminum channel rail roof ladder with folding roof hooks shall be provided with the apparatus.

Y\_\_\_\_ N\_\_\_\_

### **ROOF LADDER**

One (1) 16' Duo-Safety model 875-A, aluminum channel rail roof ladder with folding roof hooks shall be provided with the apparatus.

Y\_\_\_\_ N\_\_\_\_

**EXTENSION LADDER**

One (1) 28' two-section Duo-Safety model 1200A solid beam, aluminum extension ladder shall be provided with the apparatus.

Y\_\_\_\_ N\_\_\_\_

**EXTENSION LADDER**

One (1) 35' three-section Duo-Safety model 1225A solid beam, aluminum extension ladder shall be provided with the apparatus.

Y\_\_\_\_ N\_\_\_\_

**EXTENSION LADDER**

One (1) 24' two-section Duo-Safety model 900A solid beam, aluminum extension ladder shall be provided with the apparatus.

Y\_\_\_\_ N\_\_\_\_

**ROOF LADDER**

One (1) 16' Duo-Safety model 875-A, aluminum channel rail roof ladder with folding roof hooks shall be provided with the apparatus.

Y\_\_\_\_ N\_\_\_\_

**ATTIC LADDER**

One (1) 10' Duo-Safety model 585-A aluminum folding attic ladder shall be provided with the apparatus.

Y\_\_\_\_ N\_\_\_\_

**OUTRIGGER COVER PANELS**

Each out and down outrigger shall have a brushed stainless steel cover attached to the outer face. The cover shall fit flush with the apparatus body when the outriggers are fully stowed.

Y\_\_\_\_ N\_\_\_\_

**OUTRIGGER WARNING LIGHTS**

Two (2) red LED warning lights shall be mounted one on each out and down outrigger cover panel. These lights shall activate when the outriggers are placed into motion.

Y\_\_\_\_ N\_\_\_\_

**DEEP ALUMINUM SHELVES - ADJUSTABLE**

Five (5) adjustable aluminum shelves shall be installed and shall have a flange 1-1/2" deep and a minimum material thickness of .190" up to 30" in length. Each shelf shall be adjustable in height and held in place by four (4) extruded uprights.

Each adjustable shelf shall be installed as follows:

1. One (1) in all exterior compartments

Y\_\_\_\_ N\_\_\_\_

#### **DRI-DEK MATTING - SHELVES/TRAYS**

The surface of five (5) aluminum shelves and/or trays shall be covered with Dri-Dek mat for improved ventilation that shall also provide a non-slip surface.

The Dri-Dek mats shall be installed in all compartments, on all shelves and/or trays.

The Dri-Dek mat shall be red in color.

Y\_\_\_\_ N\_\_\_\_

#### **ALUMINUM TRAYS - PULL OUT AND DOWN**

One (1) pullout and down trays shall be installed and shall be constructed of formed .190" aluminum with a maximum capacity of 250 pounds. Each extrusion shall include a specially sized channel at both sides of the drawer for the installation of two (2) high quality stainless steel ball bearing rollers. These bearings shall provide support the outside front of each tray. A second set of stainless steel ball bearing rollers shall be provided for the inside rear of each tray. These rollers shall be bolted to the rear of each drawer and shall slide on two (2) extruded aluminum tracks that are angled to provide an "out and down" action of each tray. Each drawer slide mechanism shall be mounted in Unistrut "C" channels to allow for future adjustment and removal.

Each pullout and down tray shall be installed as follows:

1. One (1) in compartment L2.

Y\_\_\_\_ N\_\_\_\_

#### **DRI-DEK MATTING - SHELVES/TRAYS**

The surface of one (1) aluminum shelves and/or trays shall be covered with Dri-Dek mat for improved ventilation that shall also provide a non-slip surface.

The Dri-Dek mats shall be installed in all compartments, on all shelves and/or trays.

The Dri-Dek mat shall be red in color.

Y\_\_\_\_ N\_\_\_\_

#### **ALUMINUM TOOL BOARDS**

The upper half of the rear wall of three (3) exterior compartments shall be covered with tracked aluminum extrusion tool mounting board.

Tool mounting boards shall be installed on the upper back wall of L1, L2, L3 compartments.

Y\_\_\_\_ N\_\_\_\_

#### **APPARATUS BODY ELECTRICAL SYSTEM**

All body electrical shall conform to NFPA 1901 latest edition standards. The apparatus shall be equipped with a heavy-duty

12-volt negative ground system.

All 12-volt apparatus wiring shall pass through a heavy duty power disconnect solenoid. The 12-volt control of the power disconnect switch is to be triggered by the Master Battery Disconnect.

The apparatus shall be equipped with a Class1 Es-Key Management System for complete control of the electrical system devices.

The right rear compartment shall house a relay based Power Distribution Module (PDM). The PDM shall contain 12 standard automotive relays. Each relay's output shall be monitored by the Es-Key system to provide true on/off feedback. Each output shall be capable of handling up to 30 amps and be protected by an automatic circuit breaker. The PDM shall be mounted on a removable panel in the left rear compartment with sufficient harness length to allow a technician the ability to remove the PDM and place it on a compartment shelf for diagnostics and service.

All wiring shall be color-coded and function coded to assist the technician in servicing the electrical system. All circuits shall be divided and balanced for proper load distribution. Where possible, wiring shall be routed in looms as a single harness. Heat resistant convoluted loom shall be used. Only solderless, insulated crimp automotive electrical connectors shall be used.

Y\_\_\_\_ N\_\_\_\_

### **CAB ICC MARKER / WARNING LIGHTS**

Five (5) triple light LED cab face mounted light assemblies shall be supplied, recessed above the windshield.

Two (2) triple light LED side clearance light assemblies shall be supplied, one (1) each side recessed ahead of the front door.

Each triple light assembly shall contain one amber LED in the center of the cluster that will operate as a steady burn for clearance and marker operation. When the vehicle is in emergency warning light operation the amber light will turn off and the two (2) remaining red LED's shall flash in a pursuit mode pattern.

An amber diamond shaped reflector shall be mounted on the lower corner of each cab front door adjacent to the door hinge.

Y\_\_\_\_ N\_\_\_\_

### **APPARATUS ICC MARKER LIGHTING**

Two (2) amber Whelen OS Series LED side clearance lights shall be supplied, one (1) each side mounted ahead of the forward body compartment. These lights are to be mounted in a chrome flange.

Five (5) red LED clearance lights shall be supplied, mounted in the rear of the apparatus.

Two (2) red LED clearance lights shall be supplied, mounted facing the side of the apparatus.

ICC lighting utilized and lighting positions shall be in conformance with FMVSS 108.

Y\_\_\_\_ N\_\_\_\_

### **HEADLIGHTS**

Four (4) rectangular halogen headlights shall be supplied.

When the parking brake is released and the master battery switch is in the on position, the head lamps shall be illuminated to 80% brilliance.

Y\_\_\_\_ N\_\_\_\_

**TURN SIGNALS**

Two (2) rectangular Federal Signal, model QL64Z-TURN, LED turn signal lamps shall be mounted outboard of the front headlights on each side. These lights shall be amber in color.

Y\_\_\_\_ N\_\_\_\_

**SIDE MOUNTED TURN SIGNAL LIGHTS**

Two (2) Whelen, model RSA02ZCR, linear amber LED turn signal lights shall be provided mounted one each side in the front wheel well area. The lights shall be mounted in a chrome flange.

Y\_\_\_\_ N\_\_\_\_

**REAR STOP/TAIL/TURN/BACKUP LIGHTS**

The rear of the apparatus shall be equipped with Whelen 600 Series lights. The top light in the assembly shall be a red LED stop/tail light, Whelen model 60BTTC. The middle light set shall be an amber LED lamp with a populated arrow shape, Whelen model 60A00TAR and the lower lights shall be clear Halogen backup lights, Whelen model 60J00CR.

A one-piece bright finished trim shall be mounted around the rear stop/tail/turn and backup lights on each side of the apparatus.

Y\_\_\_\_ N\_\_\_\_

**SIDE MOUNTED TURN SIGNAL LIGHTS**

Two (2) Whelen, model RSA02ZCR, linear amber LED turn signal lights shall be provided mounted one each side in the rear wheel well area. The lights shall be mounted in a chrome flange.

Y\_\_\_\_ N\_\_\_\_

**BACK-UP ALARM**

A solid state electronic backup alarm shall be installed on the rear of the apparatus and wired to the backup light circuit.

Y\_\_\_\_ N\_\_\_\_

**LICENSE PLATE MOUNTING**

One (1) license plate mounting and LED light shall be provided. The light and bracket shall be located on the rear of the apparatus.

Y\_\_\_\_ N\_\_\_\_

**ROOF MOUNTED LIGHTBAR**

A dual Whelen Freedom model FNMINILED, 24" light bar system shall be supplied and permanently mounted on the cab roof, as far forward as possible. This light bar system shall be supplied with four (4) LED elements, two (2) front corner red, one (1) clear front and one (1) end red.

This light bar fulfills the requirements for Upper Zone A and in combination with the upper rear warning devices fulfills the requirements for Upper Zones B, C, and D. Any clear warning light(s) in the light bar shall be disabled automatically for the "Blocking Right of Way" mode.

Y\_\_\_\_ N\_\_\_\_

### **LOW LEVEL WARNING LIGHTS**

Two (2) Whelen warning lights, M6, Linear Super-LED light heads shall be mounted on the front of the chassis above the headlights located in the inner position on each side.

These two (2) lights fulfill the requirements for Lower Zone A lower level warning devices.

Both warning light lenses shall be red in color.

Y\_\_\_\_ N\_\_\_\_

### **FRONT INTERSECTION LIGHTS**

Two (2) Whelen warning lights, M6, Linear Super-LED light heads shall be mounted one (1) on each side of the front bumper/gravelshield with a Whelen chrome plated flange.

These two (2) lights fulfill the requirements for Lower Zone B & D lower level warning devices.

Both warning light lenses shall be red in color.

Y\_\_\_\_ N\_\_\_\_

### **BODY SIDE WARNING LIGHTS**

Two (2) Whelen warning lights, M6, Linear Super-LED light heads shall be mounted one (1) on each side of the body over the rear wheel with a Whelen chrome plated flange.

These two (2) lights fulfill the requirements for Lower Zone B & D lower level warning devices.

Both warning light lenses shall be red in color.

Y\_\_\_\_ N\_\_\_\_

### **REAR UPPER LEVEL WARNING LIGHTS**

Four (4) Whelen warning lights, M Series, model M4RR, Super-LED light heads shall be mounted on the upper rear of the apparatus with a Whelen chrome plated flange.

Two (2) Whelen warning lights, M Series, model M4RR, Super-LED light heads shall be mounted on the upper rear sides of the apparatus with a Whelen chrome plated flange.

The light heads shall include an internal flasher with 14 flash patterns, steady-burn and Hi/Low power. The warning lights shall be programmed for Hi-power with the same flash pattern for all light heads.

These lights fulfill the requirements for Upper Zone B, C & D upper level warning devices.

All warning light lenses shall be red in color.

Y\_\_\_\_ N\_\_\_\_

**REAR LOWER LEVEL WARNING LIGHTS**

Two (2) Whelen warning lights, 600 Series, Super-LED light heads shall be mounted on the rear of the apparatus below the taillights at the lower outermost corners in vertical position with a Whelen chrome plated flange.

The light heads shall include an internal flasher with 14 flash patterns, steady-burn and Hi/Low power. The warning lights shall be programmed for Hi-power with the same flash pattern for both the right and left intersection light head.

These two (2) lights fulfill the requirements for Upper Zone C lower level warning devices.

Both warning light lenses shall be red in color.

Y\_\_\_\_ N\_\_\_\_

**LED TRAFFIC ADVISOR**

One (1) amber LED Whelen traffic advisor, model TAM-85, with cable, shall be mounted on the upper rear of the apparatus. The device shall consist of eight Super-LED heads.

The signal patterns of the device shall be progressive left, progressive right, center out, and emergency "All Flash."

The switch control box is to be mounted in the cab allowing for easy operation by the driver.

Y\_\_\_\_ N\_\_\_\_

**IDENTIFICATION AND SAFETY LABELS**

A permanent plate shall be installed in the driver's compartment to specify the quantity and type of the following fluids in the vehicle:

1. Engine oil.
2. Engine coolant.
3. Transmission fluid.
4. Pump Transmission Lubrication Fluid.
5. Pump Primer Fluid (If applicable).
6. Drive Axle Lubrication Fluid.
7. Air-conditioning refrigerant.
8. Air-conditioning lubrication oil.
9. Power steering fluid.
10. Transfer case fluid.
11. Equipment rack fluid.
12. Air compressor system lubricant.
13. Generator system lubricant.

A permanent plate with pump performance data and serial numbers shall be installed on the pump panel.

A permanent plate shall be installed in the driver's compartment specifying the maximum number of personnel the vehicle is designed to carry per NFPA standards. It shall be located in an area visible to the driver.

An accident prevention sign stating "DANGER PERSONNEL MUST BE SEATED AND SEAT BELTS MUST BE FASTENED WHILE VEHICLE IS IN MOTION OR DEATH OR SERIOUS INJURY MAY RESULT" shall be placed so it is visible from all seating positions.

An accident prevention sign stating "DANGER DO NOT RIDE ON REAR STEP WHILE VEHICLE IS IN MOTION, DEATH

OR SERIOUS INJURY MAY RESULT" shall be placed so it is visible from the rear step of the vehicle.

If an inlet located at the pump operators position is valved, it shall be provided with a permanent label with language per NFPA-1901, current edition.

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### **WHEEL CHOCKS**

One (1) pair of heavy duty, high tensile molded aluminum wheel chocks measuring 7.75" high x 8.5 wide x 15" long shall be provided with the apparatus. The wheel chocks shall have a bright yellow powder coat finish for high visibility, safety and corrosion resistance. No exception shall be allowed to these requirements.

Two chock holders shall be provided and mounted on the left side of the apparatus below the front body compartment.

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### **REFLECTIVE SAFETY STRIPE**

A 1" x 6" x 1" wide 3M brand Scotchlite reflective stripe shall be affixed to the perimeter of the vehicle. The striping shall be placed up to 60" above ground level and shall conform to NFPA reflectivity requirements. At least 60% of the perimeter length of each side and width of the rear, and at least 25% of the perimeter width of the front of the vehicle shall have reflective stripe.

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### **BODY STRIPE "Z" PATTERN**

The stripe on each side of the apparatus shall run straight back to the body, with a reverse "Z" pattern shape on the front body door and then run straight back from there to the rear of the body.

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### **REFLECTIVE STRIPE COLOR**

The apparatus body striping shall be white reflective.

The smaller accent stripe(s) shall be gold reflective.

Y\_\_\_\_ N\_\_\_\_

### **WATER TANK WARRANTY**

The water tank is to be free from defects in material and workmanship for the normal service life of the apparatus in which the water tank is installed.

If a tank has a defect in material or workmanship covered by the warranty, the tank manufacturer shall repair at their cost, by authorized personnel or authorized third parties. The tank manufacturer shall make an effort to effectuate repair within 48 hours following initial notification of a covered defect. The tank manufacturer shall make a reasonable effort to repair tank at most convenient location to end user.

The tank manufacturer shall reimburse all reasonable costs associated with rendering the tank accessible for repair, including, but not limited to, removal and reassembly of the hose bed floor.

Y\_\_\_\_ N\_\_\_\_

**APPARATUS WARRANTY**

The apparatus manufacturer shall provide a limited parts and labor warranty to the original purchaser of the apparatus for a period of twelve (12) months, or the first 24,000 miles, whichever occurs first. The warranty period shall commence on the date the vehicle is delivered to the end user. The warranty shall include conditional items listed in the detailed warranty document which shall be provided upon request.

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**10 YEAR BODY STRUCTURAL WARRANTY**

The manufacturer shall provide a limited parts and labor warranty to the original purchaser of the custom built apparatus body for a period of one hundred twenty (120) months. The warranty period shall commence on the date the vehicle is delivered to the end user. The warranty shall include conditional items listed in the detailed warranty document which shall be provided upon request.

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**10 YEAR BODY CORROSION LIMITED WARRANTY**

The bidder, shall warrant only to the original purchaser and the first purchaser who places the motor vehicle in service that the apparatus body manufactured by the bidder (the "body"), under normal use and with normal maintenance, will remain free from corrosion for a period of ten (10) years from the date that the motor vehicle was first placed in service. A body shall be considered to have "corrosion defects" if it is found by the bidder to have perforation caused by corrosion under normal use and with normal maintenance.

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**STAINLESS PIPING WARRANTY**

The bidder shall warrant that all stainless steel piping used in the construction of the fire apparatus water/foam plumbing systems against defects and workmanship provided the apparatus is used in a normal and reasonable manner. This warranty is extended only to the original user-purchaser for a period of ten (10) years from the date of delivery to the original user-purchaser, whichever occurs first.

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**REAR MOUNT THREE SECTION LADDER SPECIFICATIONS**

**AERIAL LADDER DESIGN AND CONSTRUCTION**

A 80' three-section steel rear mount aerial ladder shall be provided. It shall have a maximum height of 79' 10" at the top rung of the fly section at 75-degrees elevation. The horizontal reach from the top rung to the center of the turntable shall be 71'-3.25".

Y\_\_\_ N\_\_\_

**EXTENSION AND RETRACTION SYSTEM**

Two (2) 4" inside diameter cylinders, each with 2" outside diameter rods and a 60" stroke, are used in the extension and retraction system. The specified extension cylinders shall not exceed the specified length. The required length cylinders shall place the cylinder weight closer to the base of the aerial device. Smaller size cylinders are required since they are easier to handle for removal for service reasons. In addition, the specified shorter stroke cylinders provide less potential for damage to the rod by hitting an obstacle when extended.

The extension cylinders shall have counter balance valves mounted directly to them and shall extend and retract the aerial with a 4 to 1 cable cylinder arrangement from totally retracted to 75' at 75 degrees totally extended.

The extension and retraction system shall have four (4) pairs of cables. Mid-section cables shall have a .375" diameter and fly section cables shall have a .375" diameter.

Each of the cylinders, cables, and sheave assemblies shall be completely independent of the other system, so as to provide a safety factor wherein a failure of one assembly shall not affect the function and operation of the other assembly. Each set of cables shall be capable of operating the ladder in the event of a failure of the other.

There are no restrictions on the waterway as the ladder is extended and retracted

Y\_\_\_\_ N\_\_\_\_

**STATE-OF-THE ART TECHNOLOGY**

The aerial device materials, parts, technology or procedures used in construction of the apparatus are subject to change at the manufacturer's discretion to provide "equal or better" products and must be in compliance to applicable NFPA #1901 standards and industry standard practice.

Y\_\_\_\_ N\_\_\_\_

**LADDER BASE SECTION**

The ladder base section length shall be 28' 10", with inside dimension of 34.25"; distance between the top of the handrail and the centerline of the rungs shall be 23.875".

The base rails shall be constructed with 70,000 PSI steel material and the handrails shall be constructed with 70,000 PSI steel material.

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**LADDER MID SECTION**

The ladder mid-section length shall be 28' 11", with inside dimension of 28.375"; the distance between the top of the handrail and the centerline of the rungs shall be 19.875".

The base rails shall be 70,000 PSI material and the handrails shall be 70,000 PSI steel material.

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**LADDER FLY SECTION**

The ladder fly section length shall be 33'-3" including the bolt-on egress, with inside dimension of 23"; the distance between the top of the handrail and the centerline of the rungs shall be 16.375".

The handrails and base rails shall be 70,000 PSI steel material.

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**TECHNICAL DRAWINGS**

Technical and engineering drawings shall be provided for the apparatus with the aerial ladder as follows: left side view, top view and rear view.

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**TECHNICAL DRAWINGS -- 12 VOLT ELECTRICAL SYSTEM**

Technical and engineering drawings shall be provided for the 12-volt electrical system for the model of apparatus specified.

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**TECHNICAL DRAWINGS -- HYDRAULIC SYSTEM**

Technical and engineering drawings shall be provided for the aerial device hydraulic system.

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**AERIAL OPERATING INSTRUCTIONS AND DEMONSTRATION**

As required by applicable sections of NFPA #1901, operating instructions and demonstration of the aerial apparatus shall be provided at the purchaser's location. A trained and qualified technician of the sales representative shall provide these instructions and demonstration of the aerial apparatus.

Personnel providing the instructions shall be professionally trained by the aerial manufacturer prior to the delivery process. All costs of these instructions shall be borne by the bidder. The bidder shall notify the purchaser a minimum of 14 days prior to the instruction period. The bidder shall provide classroom instructions, instruction and operating manuals as required by NFPA #1901, and provide all other necessary material necessary to assure proper operation of the aerial device.

This instruction period shall be a minimum of two (2) days at the purchaser's location.

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**AERIAL OPERATION AND SERVICE DOCUMENTATION**

The bidder shall supply, at time of delivery, at least two (2) sets of complete operation and service documentation covering the completed apparatus as delivered and accepted. The documentation shall address at least the inspection, service, and operations of the fire apparatus and all major components thereof. This documentation and manuals shall be provided in the English language.

Y\_\_\_ N\_\_\_

**OVERALL AERIAL WARRANTY**

Manufacturer shall provide a two (2) year or 100,000 miles overall parts and labor warranty as follows:

The aerial manufacturer shall warrant to the purchaser that the complete aerial device and system was manufactured to comply with the manufacturer's bid specifications and free in all respects from any defects in materials or workmanship.

The warranty shall expire on the earlier of two (2) year or 100,000 miles from the date of delivery. This warranty shall include all parts and labor. The cost of transportation of vehicle to the warranty location shall be provided by the purchaser.

The obligations of the aerial manufacturer, pursuant to the foregoing warranty, with respect to the aerial shall be limited to the cost of bringing such aerial into compliance with the specifications or of removing any defects in materials or workmanship.

All warranty work performed must be completed at manufacturer's facility or an approved service center.

Any work or alterations on or misuse of the aerial performed by anyone other than the aerial manufacturer's designated personnel, either before or after delivery to the purchaser, shall not be warranted by the manufacturer and shall cause to make this warranty invalid.

This warranty shall not apply to those items which are usually considered normal maintenance and upkeep services, including, but not limited to electrical lamps, valve seals, normal lubrication and/or proper adjustment of minor items.

Y\_\_\_\_ N\_\_\_\_

### **AERIAL STRUCTURAL WARRANTY**

The aerial ladder sections shall carry a warranty against structural failures caused by defective design or workmanship for a period the earlier of twenty (20) years or 100,000 miles. This warranty shall commence on the date vehicle is accepted by the original purchaser.

The structural warranty shall be conditional upon normal and reasonable maintenance as outlined in the operating and service manuals provided with the vehicle. In addition, the apparatus shall be maintained, inspected, and tested in compliance to applicable NFPA #1901, #1911, and #1914 standards. The structural warranty does not cover defects caused from misuse, negligence, accident. This warranty shall not apply if the aerial device is remounted on another chassis.

Should repair become necessary under the terms of this structural warranty, the manufacturer or a facility authorized by the manufacturer, shall perform all repairs and warranty work. The expense for any transportation to or from such facility shall be that of the purchaser. All warranted parts shall become the property of the manufacturer.

The obligations of the manufacturer pursuant to the foregoing warranty with respect to the aerial ladder sections shall be limited to: 1) the cost of bringing such ladder into compliance with the specifications 2) or of removing any defects in materials or workmanship. In-direct costs, such as transportation, labor, out-of-service time, etc. shall not be covered by this warranty.

Any work or alterations on the aerial, performed by anyone other than the manufacturer or its designated personnel, after acceptance of the apparatus by the purchaser, shall not be warranted and shall cause the warranty to be invalid.

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### **TESTING CRITERIA**

The aerial ladder shall receive third party Type #1 System testing. Non-destructive testing (NDT) shall be performed on each unit at a rate of 100% inspection by the third party inspector, exceeding the requirements of NFPA #1901. All NDT procedures shall be fully documented and meet or exceed the requirements of NFPA #1901.

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### **AERIAL WATERWAY FLOW TESTING**

The waterway flow test shall be conducted by an accredited third party testing organization with certified results provided on delivery of the apparatus. Standard model flow test data shall be provided to the purchaser for the aerial device.

If the water system has been modified from the standard model configuration, a new flow test shall be conducted to determine that the friction loss in the water system between the base of the swivel and the monitor outlet does not exceed 100 psi (700 kPa) with 1000 gpm (3748 L/min) flowing and with the water system at full extension.

A flow test shall be conducted to determine that the water system is capable of flowing 1000 gpm at 100 psi nozzle pressure with the aerial device at full elevation and extension.

The intake pressure to the fire pump shall not exceed 20 psi.

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### **AERIAL DEVICE PAINTING**

Before assembly, in preparation for the final painting, the aerial ladder sections and turntable shall be thoroughly cleaned and prepared to conform to good painting practices. The aerial ladder sections and turntable shall be primed with two (2)

coats of PPG or equal lead free primer. Ladder sections and turntable shall then be sprayed with one (1) coat of color using PPG Pewter PPG#36240.

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### **GALVANIZED OUTRIGGERS**

The aerial outriggers assemblies, beam, outer jack tube, inner jack tube, jack cover plate, and jack pad shall be galvanized.

The outriggers shall be galvanized inside and out. The process shall eliminate the rusting, scratching or paint chips on the outriggers. The galvanizing process shall permeate the metal and shall not be an "over-coating only" on outside surfaces. The galvanized components shall lessen the potential for corrosion and eliminates the requirement for finish paint. The process shall negate any later requirement for touch-up paint or total repaint of the outrigger/stabilizer assemblies.

The galvanizing shall provide the steel outriggers with both barrier and cathodic protection from corrosion. The galvanizing process shall immerse the complete outrigger components in molten zinc. The galvanizing diffusion process shall allow the zinc to bond to the steel, at the molecular level. The galvanized zinc coating shall provide a barrier that shields the steel from the environment.

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### **AERIAL OUTRIGGERS/STABILIZERS -- CORROSION PROTECTION WARRANTY**

A galvanized steel corrosion protection warranty shall be provided for the aerial outriggers and stabilizers for a period of twenty-five (25) years. The conditions of the corrosion protection warranty shall be as follows.

1. This warranty shall cover parts and labor to correct the affected area or parts only and shall not be deemed to include entire outrigger or stabilizer assemblies. This warranty does not include the turntable, aerial ladder sections, or torque box.
2. Should any warranty claim occur, the affected area shall be inspected, reviewed and approved by the aerial manufacturer prior to any work being completed.
3. Any authorized warranty work shall be only performed by the aerial manufacturer or its designated repair personnel or facility. Any repairs completed by un-authorized repair shops or personnel shall cause this warranty to be invalid.
4. Transportation costs associated with this corrosion protection warranty shall be the responsibility of the purchaser.
5. Warranty shall not cover damage due to lack of specified normal maintenance and service as outlined and required in the service and operating manuals provided with the apparatus.
6. Warranty shall not cover damage from accidents, abuse, physical and mechanical damage, and all other conditions not considered as "normal" operating conditions.
7. The obligations of the aerial manufacturer pursuant to the foregoing warranty with respect to the outriggers and stabilizers shall be limited to the cost of bringing the affected area into compliance with the specifications or of removing any defects in materials or workmanship.

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### **TORQUE BOX PAINTING**

The torque box shall be properly cleaned and prepared for final painting process. The torque box shall be painted with two (2) coats of black paint.

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**AERIAL LADDER RUNG SPECIFICATIONS**

For ease of climbing the ladder rungs shall be equally spaced on a maximum 14" centers and minimum 11.75" centers and shall have a skid-resistant surface or covering.

For added safety, skid-resistant rung covering shall be provided. The rung covering shall not twist and shall cover at least 60 percent of the climbing area of each rung.

Round rungs shall be provided and shall have a minimum outside diameter of 1-1/4", including the skid-resistant surface or covering.

For maximum strength, the minimum design load for each rung shall be 500 lb distributed over a 3-1/2" wide area at the center of the length of the rung with the rung oriented in its weakest position.

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**NON-SKID AERIAL RUNG COVERING**

Each aerial rung shall be covered with one (1) piece of a protective, pultruded FRP, non-skid material. The cover shall be black in color with the outer four (4) inches on each side of the rung red photoluminescent.

Y\_\_\_ N\_\_\_

**AERIAL WEAR PADS**

The aerial wear pads shall be "PET" type and shall incorporate semi-crystalline hardness, rigidity, mechanical strength with exceptional sliding properties and very low sliding wear. The pads shall be used between the telescoping sections for maximum weight distribution, strength, and smooth operation. Side wear pads shall be nylatron GSM, stainless steel adjustment screws shall be provided on the side wear pads to permit proper side clearance.

No Base Rail Handrail Extensions Required

Y\_\_\_ N\_\_\_

**AERIAL SIGN PANELS**

The base section of the aerial device shall include sign panels, 12" high x 120" long, one on each side of the aerial. The sign panels shall be painted to match the aerial ladder sections.

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**EXTENSION MARKINGS**

To improve safety and to provide the operator with vital information, extension markings shall be provided. For best visibility the base section of the ladder shall include markings on the outside of the left handrail and the inside of the right handrail to indicate extension position of the ladder in operation. The markings shall be BLACK numbers that will mark every 10 feet with a hash mark between the numbers. The 80' Marking shall be red in color.

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**ROOF LADDER MOUNTING BRACKETS -- BASE SECTION**

There shall be welded plates and bolt on roof ladder mounting brackets installed on the outside of the base section of the aerial opposite of the control panel.

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### **ROOF LADDER**

A Duo Safety Model 775-A, 10 foot aluminum roof ladder with folding steel roof hooks on one end and feet on the other end shall be installed on the outside of the base section. The ladder shall meet or exceed applicable NFPA standards. It shall be standard width 19" Duo-Safety roof ladder

Y\_\_\_\_ N\_\_\_\_

### **FOLDING STEPS -- FLY SECTION**

The ladder shall be equipped with two (2) folding steps, one on each side of the ladder at the upper end of the fly section. These steps are spring loaded to hold in the stowed position. Once lowered, steps lock in the lowered position for use.

When steps are in the use position there shall be approximately a 7-1/2" diameter circular space for a hose to be placed on the rungs. The folding steps shall comply to applicable standards of NFPA #1901.

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### **ROPE RESCUE EYELETS -- FLY SECTION**

Two (2) rope rescue eyelets shall be installed one on each side at the tip of the fly section, each anchor being rated at 250 pounds, for a total combined weight rating of 500 pounds.

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### **MOUNTING PLATE FOR AXE AND PIKE POLE -- FLY SECTION**

Welded-in mounting plates shall be installed for the an axe mounting on the right side and a pike pole mounting on the left side of the fly section.

Bolt On Mounting Brackets will not be accepted.

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### **ROTATION SYSTEM**

The rotation system shall be powered by a hydraulic motor to drive an eccentric planetary gearbox, capable of field adjustment, to rotate the aerial.

A 44.6" pitch diameter external tooth bearing shall be provided for 360 degree continuous rotation in either direction. As turntable bearing bolts are required to be checked and re-torqued at regular intervals, to make this task relatively simple, the ability to re-torque all bolts from the top of the turntable is mandatory.

The bearing shall be bolted to the bearing base plate using twenty-four (24) .875" SAE Grade 8 bolts and shall also be bolted to the turntable using thirty (30) .875" SAE Grade 8 bolts.

A hydraulic release spring applied brake shall provide a positive lock for the rotation.

Two (2) pressure relief valves shall control the force of the rotation to protect the aerial from excessive side loads.

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### **LANGUAGE**

All panels including main operations stations, outrigger stations, warning labels and load charts shall be written in English.

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## **TURNTABLE AND PLATFORM CONTROL CONSOLES**

### **AERIAL CONTROL OPERATING SYSTEM**

The aerial control system is to be monitored by programmable logic control. The programmable logic control operating system must be able to monitor the following functions a minimum of 20 times per second to offer maximum safety. The monitored aerial control functions are as follows:

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### **AERIAL SPEED**

The speeds of all aerial functions are to be proportionally regulated by the elevation and extension of the aerial. The aerial shall have proportional slow down on full extension and full retraction. The elevation system shall proportionally reduce the speed at sixty (60) degrees and ramp to off at full elevation. Lowering shall proportionally reduce the speed at three (3) degrees and ramp to off at minus ten (-10) degrees. When the aerial is fully retracted the aerial speed shall be 20 percent faster than when fully extended.

The joystick shall have a trigger switch to energize the hydraulic system for the aerial functions. The switch shall have two (2) functions, high speed and low speed. All ladder controls operate at high (full speed) or low (reduced speed). With the trigger switch activated the RPM's shall increase to 1,250 RPM and maintain there for two (2) seconds after returning to the neutral position. An emergency stop button shall be used for emergency stopping and shall return the system to the "off" position, allowing the engine speed to return to normal idle speed and the hydraulic system to de-energized.

### **Cab and Body Collision Protection**

Programmable cab and body collision protection shall have three (3) amber lights to indicate Right Rotation Disabled, Down Disabled and Left Rotation Disabled. The lights shall illuminate when aerial functions (right rotation, left rotation or lowering) are disabled. All three lights shall illuminate when the E-STOP is pushed or the outrigger interlock is active.

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### **AUTO BEDDING**

The aerial shall have a momentary switch for auto bedding. Activation of the momentary switch when the aerial is within 20 degrees left or right of the ladder bed, below 20 degrees elevation and 75 percent retracted will automatically bed the aerial.

Y\_\_\_\_ N\_\_\_\_

### **RUNG ALIGNMENT**

The aerial rung alignment light shall be monitored by an absolute encoder system. The indicator light shall illuminate when the rungs are aligned for the safety of climbing the aerial.

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### **SOFT TOUCH CONTROLS**

All aerial controls left/right, extend/retract and raise/lower shall be Soft Touch controllers. The Soft Touch controls shall have built in ramp up and ramp down capabilities. The turntable controls shall override the platform controls at all times.

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### **SHORT JACKED OUTRIGGERS**

Programmable logic control system allows the aerial to rotate over the short jacked outriggers, when the aerial is within the safe operating parameters of the programmable logic control program. A red warning light at the outrigger and aerial operator's control consoles shall warn the operator that one (1) or more outriggers have been "short set". In the event the vehicle has been set up with one (1) or more of the outriggers "short set", any rotation of the turntable to an unsafe short set

outrigger shall automatically ramp the rotation of the turntable to a feather-soft stop and allow the operator to return to safe operating parameters.

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### **AERIAL LOAD GAUGE**

An aerial load gauge shall give a continuous reading of the load on the device. This gauge shall have a green light showing the load on the ladder, an amber light will tell the operator when the aerial is nearing the rated load and a red light will flash at the point where rated load capacity is reached. Additionally, there shall be a warning horn that shall sound if the ladder is overloaded by 0 - 10% of its rated capacity. The horn shall emit a constant sound when rated capacity is exceeded by more than 10%. If the ladder is over loaded the extension and lowering ability of the aerial shall be disabled until the weight can be removed or shifted.

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### **STANDARD AERIAL CONTROL PANEL**

The turntable shall have the operator's stand on the driver's side. Mounted in this control stand there shall be a joystick pod. The joystick pod shall contain:

- Joystick control for operation of the aerial for raise / lower, extension / retraction, and swing left/right functions
- Three (3) remote monitor switches

The joystick pod shall be mounted to the operator's stand. On the stand there shall be the following switch functions:

- One (1) switch to lock all aerial functions (high/low/off)
- One (1) switch for auto bedding
- One (1) turntable tracking light switch
- One (1) tip light switch
- One (1) emergency pump switch
- One (1) Air horn switch
- One (1) emergency stop button

The operator's stand shall also include an 800x480 pixel LED color display screen. Due to the outdoor installation the screen is required to be rated at a minimum of IP-65. The display shall have multiple menus displaying the following information:

- Indicate when outriggers are not fully extended
- Ladder bed alignment indicator
- Rung alignment indicator
- Green, amber, and red bar graph with audible alarm for the aerial load system display
- Indicators for left rotation disable, down disable, and right rotation disable.
- Digital display of aerial main system pressure
- Waterway position indicator for rescue or water tower operation
- Waterway flowmeter readout

A turntable LED work light shall be provided on the control console for added operator visibility and safety.

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### **LADDER TIP CONTROLS -- FLY SECTION**

The ladder shall be capable of operation at the tip of the fly section with creeper controls. Operation of the fly section controls shall be enabled only when the turntable operator has engaged a momentary switch at the turntable.

Three (3) toggle switches will be used to activate the aerial functions, raise/lower, extend/retract, and rotate, at 30% of the rated speed.

A toe guard shall be installed at the front of the aerial to prevent the foot from slipping in between the rails as per NFPA.

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### **TURNTABLE SHAPE --TWO SIDED**

The turntable shall be two sided (left and rear) with the corners cut to allow for personnel to enter and exit the turntable. The turntable walking area shall be covered with NFPA #1901 compliant skid resistant aluminum tread plate material, with a 2-1/2" lip. Two (2) 42" high, slip resistant covered handrails capable of withstanding a 225 pound force applied from any direction shall be installed on the turntable.

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### **MANSAVER BARS -- TURNTABLE OPENINGS**

Two (2) Fire Research ManSaver bars shall be installed on the left and right side of the turntable. The safety bars shall lift either upward or inward to open, and be spring loaded to automatically return to the horizontal closed position. The safety bar assembly shall be made of aluminum and stainless steel. The length of both bars shall be 24".

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### **AERIAL TURNTABLE PEDISTAL CONSOLE**

The aerial control console shall be constructed from brushed stainless. The back and side of the control panel shall have one (1) full hinged door. The door is provided for maintenance and emergency operation of the aerial.

Y\_\_\_\_ N\_\_\_\_

### **SHORT-SET OUTRIGGERS**

The aerial device shall be equipped with a Smart Aerial system for short-jacking.

A short-set outrigger is an outrigger that is not out at least 96 percent of its total extension capability. The smart aerial limits aerial functionality based on extension of all outriggers.

Short-Set rear outriggers shall not affect ladder movement while the ladder is within 50 degrees either side of the ladder bed.

If a short-set restriction is active, the "Outrigger Not Extended" indicator at all ladder control stations shall flash rapidly.

The smart aerial shall monitor the outrigger placement of all outriggers and the elevation extension and load on the aerial to determine if the aerial can rotate safely over a short set outrigger.

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### **OUTRIGGER CONTROL PANEL**

The outrigger control panel shall have a switch to energize the hydraulic system for outrigger functions. The switch shall increase the engine speed to 1,200 RPM when in the "ON" position. In the "OFF" position, the engine speed shall return to normal idle speed and the hydraulic system shall be de-energized.

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## **CONTROL PANEL**

The control panel shall include the following:

1. Manual override system to override the outrigger-aerial interlock system
2. One (1) switch to start and stop all aerial and outrigger operations.
3. One (1) switch for the emergency power unit.
4. Amber indicating lights shall signal when the outriggers are extended or supporting sufficient load.
5. A pulsing beeper shall be activated when the outrigger system is in use.
6. One (1) red flashing light shall be provided to indicate if outriggers have been short set.
7. One (1) aerial hour meter connected to the PTO shall be installed at the outrigger control station.
8. One (1) hydraulic pressure filter indicator light.

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## **AMBER INDICATING LIGHTS**

If an outrigger is extended and not lowered an amber indicator light shall flash rapidly, indicating the jack cylinder is not supporting any load. If the outrigger is fully extended and the jack cylinder is supporting sufficient load the amber indicator light shall be solidly lit. If an outrigger is short-jacked the amber indicator light shall flash slowly.

All Smart Aerials can operate all functions over a short-jacked outrigger. If the aerial were to become overloaded or unsafe the ladder would slow to a smooth stop and the right disable, left disable or down disable light shall illuminate indicating the direction the operator is no longer able to rotate. The aerial can operate away from the unsafe position with one operator.

Y\_\_\_\_ N\_\_\_\_

## **AUTOMATIC SELF DEPLOYMENT SELF LEVELING OUTRIGGERS**

The aerial shall have the ability to automatically deploy the outriggers. The function shall be initiated by a momentary switch located in the center rear outrigger control panel. When the switch is activated the outriggers are to extend. Each outrigger is to be equipped with an ultrasonic sensor. If the sensor should detect an object in the path of the outrigger, the outrigger will be stopped short of the object. When all of the outriggers are extended, the outriggers shall lower. After all outriggers have made ground contact, the system will auto-level the apparatus for aerial operation. A blue LED indicator light in the center of the rear of the body will illuminate when the auto-deploy process has been successfully completed.

The auto-deploy function will be stopped automatically if there is an error in the auto-deploy process. The function can also be stopped at any time by releasing the auto-deploy switch, activating any of the control joysticks, or by turning off the outrigger enable switches.

Y\_\_\_\_ N\_\_\_\_

## **STYLE 3578 STREAM MASTER ELECTRIC MONITOR**

An Akron Brass, model 3578, 2000 GPM rated monitor shall be provided at the end of the waterway. The monitor is an all-electric 12 volt single waterway monitor constructed of lightweight Pyrolite with a 4", 150 pound flange inlet and 3.5" thread outlet with cast-in turning vanes in each elbow. The monitor shall have fully enclosed motors and gears with manual overrides for both horizontal and vertical rotation. The manual override shall have captive cranks, one for horizontal and one for vertical rotation, and may be used simultaneously.

The monitor is not to exceed 16-1/4" high and 12-1/4" wide. The rotation of the monitor is from 0 degrees to 135 degrees below horizontal elevation. The logic box shall include coated, solid state components to resist water corrosion.

Three (3) toggle switches shall be located at the turntable aerial control stand and at the tip of the aerial. The switches will control the raise/lower, stream/shape, and left/right functions of the monitor. The controls at the aerial control stand will override the controls at the tip of the aerial.

Y\_\_\_\_ N\_\_\_\_

## **STYLE 5177 AKROMATIC 1250 ELECTRIC MASTER STREAM NOZZLE**

An Akron Brass item 51770001 Akromatic 1250 electric combination fog and straight stream master stream nozzle with automatic flow mechanism shall be installed on the Akron monitor. The nozzle shall be constructed of durable, lightweight Pyrolite and shall have electric pattern section from straight stream to wide fog controlled by a 12 volt motor and linear ball screw, a manual override pattern control knob, built-in stream shaper, and 3.5" NH swivel.

Y\_\_\_\_ N\_\_\_\_

### **AKRON AUTO-STOW**

A momentary switch shall be installed at the turntable for programmable auto-stow. The switch will allow the monitor to be stowed (stored) at a pre-programmable location.

No, Stacked Tips

No, Stream Shapers

Y\_\_\_\_ N\_\_\_\_

### **HYDRAULIC HIGH PRESSURE OIL FILTER**

The hydraulic system shall be equipped with a 'high pressure' hydraulic oil filter between the pump and the control valve designed to meet the flow requirements of the system. There shall be a filter replacement light on the outrigger control panel for the convenience of the mechanic. The return filter and pressure filter shall be connected together to the same light on the outrigger control panel to indicate replacement of filters.

A spare HP Filter shall be shipped loose.

Y\_\_\_\_ N\_\_\_\_

### **HYDRALIC OIL RETURN LINE FILTER WITH LIGHT**

A 10 micron low pressure return line filter element shall be connected to the hydraulic reservoir. The 10 micron return line replaceable filter. There shall be a filter replacement light on the outrigger control panel for the convenience of the mechanic. The return filter and pressure filter shall be connected together to the same light on the outrigger control panel to indicate replacement of filters.

Y\_\_\_\_ N\_\_\_\_

### **AERIAL WARNING LABELS**

Danger, caution, and warning labels shall be installed at all aerial control stations, individual controls, and at various locations on the aerial device. These labels shall be in compliance to industry warning symbols, ASME, SAE, and applicable NFPA #1901 standard. These labels shall be in English with symbols commonly used in the fire industry.

Y\_\_\_\_ N\_\_\_\_

### **AERIAL LOAD CHART -- TURNTABLE CONTROL STAND**

An aerial load chart shall be mounted on the base section of the aerial to supplement the load gauge installed on the aerial control console. The load chart shall include the height and reach and the load at six (6) different angles with and without water. An arrow will be attached to the load chart to indicate the angle of elevation. To comply with NFPA standards the load chart shall be illuminated by a light.

Y\_\_\_\_ N\_\_\_\_

**LIGHTED ANGLE ELEVATION INCLINOMETER**

One (1) lighted angle elevation inclinometer shall be mounted on the left side of the base section of the aerial.

Y\_\_\_\_ N\_\_\_\_

**TORQUE BOX**

The torque box connecting the turntable to the outriggers shall provide the rigidity needed for the aerial to be operated at -10 degrees to a +75 degrees elevation and full extension.

The torque box shall have approximate dimensions of:  
43" inside width  
27" inside height  
198.5" long (the back shall be open for ground ladder storage)

Y\_\_\_\_ N\_\_\_\_

**AERIAL OUTRIGGERS AND STABILIZER SPECIFICATIONS**

The aerial device outriggers and stabilizers shall be designed to function with the standard hydraulic components. Each outrigger shall have a pad that pivots left-to-right and front-to-rear.

Y\_\_\_\_ N\_\_\_\_

**AERIAL SET-UP REQUIREMENTS**

With the stabilizers set, the aerial device shall be capable of being raised from the bedded position to maximum elevation and extension and rotated 90 degrees. Two or more of these functions shall be permitted to be performed simultaneously. These functions are required to be completed within 120 seconds or less, no exceptions.

Y\_\_\_\_ N\_\_\_\_

**EXTENSION BEAMS**

The extension beams shall entirely enclose the extension cylinders to prevent damage to the rods and hoses. Each outrigger shall be controlled independently with one (1) joystick controller, which can extend and lower the outrigger at the same time or raise and retract the outrigger at the same time.

A double box design shall enclose the jack cylinders completely to protect the rods from damage that could result from exterior circumstances.

Y\_\_\_\_ N\_\_\_\_

**JACK CYLINDERS**

The jack cylinders shall have pilot operated check valves for both the raised and lowered positions. Each jack tube shall be drilled for mechanical pin locks for a safety backup.

The outrigger jack cylinders shall be mounted so they can be removed from the top of the outrigger jack tube. Jack cylinders that are removed from the bottom of the outrigger jack tube will not be accepted.

Y\_\_\_\_ N\_\_\_\_

**OUTRIGGER DEPLOYMENT ALARM AND WARNING SYSTEM**

The outrigger deployment alarm, of not less than 87 DBA, shall sound at all times while the outrigger master switch is in the on position and stops sounding only when the outrigger switch is turned off. The audible alarm shall warn personnel that outrigger movement is possible at any time the switch is on.

A red LED flashing light shall be mounted to the inside of the vertical outrigger jack beam. The aerial master switch shall activate the lights.

Y\_\_\_\_ N\_\_\_\_

**SAFETY FEATURES**

The outrigger system shall provide the following safety features on a control panel located at the rear of the vehicle at ground level:

The outrigger interlock system shall prevent raising of the aerial ladder prior to all outriggers being in firm contact with the ground.

A red warning light shall warn the operator that one (1) or more outriggers has been short set. In the event the vehicle has been set up with one or more of the outriggers short set. Short jack operation requires the intervention of a second operator to control the override switch enabling aerial operation.

An amber indicator light for each outrigger to indicate when the outrigger jack is supporting enough load to be in firm contact with the ground.

Green indicator light shall indicate circuit completion to show that the unit is ready for aerial operation.

An aerial cradle/outrigger interlock system shall be provided to prevent the lifting of the aerial from the nested position until the operator places all jacks in the load supporting configuration. The ladder bed switch prevents the operation of the outriggers once the aerial has been elevated from the nested position.

LED Ground illumination lights shall be provided to illuminate the area of the outriggers for each extending outrigger.

Outriggers shall be wired with outrigger stowed switches with a light in the cab and a message in the cab message center.

Y\_\_\_\_ N\_\_\_\_

**OUTRIGGER AND STABILIZER SPECIFICATIONS**

The specified outriggers and torque box system shall provide a 1-1/2 to 1 stability safety factor when the aerial is in any operating position.

The stability requirements shall be met by the apparatus on which the aerial device is mounted when that apparatus is in a service-ready condition but with all normally removable items such as water, hose, ground ladders, and loose equipment removed.

All outriggers and stabilizers that protrude beyond the body of the apparatus shall be striped or painted with reflective material so as to indicate a hazard or obstruction. Each outrigger or stabilizer shall also be provided with one or more red warning light(s) located either on the stabilizer or in the body panel visible on the side of the apparatus where the stabilizer is located.

Y\_\_\_\_ N\_\_\_\_

**OPERATION ON GRADES**

The aerial shall be capable of The aerial device shall be capable of sustaining a static load 1-1/3 times its rated capacity in every position in which the aerial device can be placed when the apparatus is on a slope of 5 degrees downward in the direction most likely to cause overturning. Operation beyond this limit shall be at the operator's discretion.

Y\_\_\_\_ N\_\_\_\_

**OUTRIGGERS REAR OF AXLE**

Two (2) out-and-down outriggers shall be installed behind the rear axle and shall be connected to the torque box.

The outrigger assembly shall consist of the following components:

- A two (2) inch bore cylinder shall extend and retract the outrigger(s) 48.375"
- A five (5) inch bore cylinder shall raise and lower each jack tube a distance of 22.156"

Y\_\_\_\_ N\_\_\_\_

**OUTRIGGER SPREAD**

The total width from the center of pivot pin to center of pivot pin when the outriggers are fully extended shall be 15' 6".

Y\_\_\_\_ N\_\_\_\_

**OUTRIGGER CONTROL PANEL**

The outrigger control panel shall have a switch to energize the hydraulic system for outrigger functions. The switch shall increase the engine speed to 1,200 RPM when in the "ON" position. In the "OFF" position, the engine speed shall return to normal idle speed and the hydraulic system shall be de-energized.

Y\_\_\_\_ N\_\_\_\_

**CONTROL PANEL**

The control panel (illuminated by LED lights) shall include the following:

- A manual override system to override the outrigger-aerial interlock system
- One (1) switch to start and stop all aerial and outrigger operations.
- One (1) switch for the emergency power unit.
- Amber indicating lights shall signal when the outriggers are supporting sufficient load.
- A pulsing beeper shall be activated when the outrigger system is in use.
- One (1) red light shall be provided to indicate if outriggers have been short set.
- One (1) aerial hour meter connected to the PTO shall be installed at the outrigger control station.

Y\_\_\_\_ N\_\_\_\_

**OUTRIGGER AUXILIARY PLATES**

An auxiliary outrigger plate shall be provided for each outrigger. The units shall be 2' x 2' in size, one for each outrigger made from 1/2" aluminum with a handle for easy movement.

Y\_\_\_\_ N\_\_\_\_

**OUTRIGGER STOWED INDICATOR**

An outrigger stowed indicator light will be provided in the cab to show that one or more outriggers are not in the stowed position. The light will be connected to the door ajar / outrigger extend light in the cab.

Y\_\_\_\_ N\_\_\_\_

**AERIAL LADDER CAPABILITIES -- 1000GPM**

The following are aerial ladder and water capabilities for the operation of this unit in the unsupported configuration with the truck level, the outriggers fully extended and lowered to relieve the chassis weight from the axles. The capabilities are based upon 360-degree continuous rotation and up to full extension.

Ladder Operations

ELEVATION

CAPABILITIES

-10 Degrees to 30 Degrees

500 pounds at the outermost rung of the fly section or 1,000 pounds evenly distributed

30 Degrees to 45 Degrees

500 pounds at the outermost rung of the fly section or 1,500 pounds evenly distributed

45 Degrees to 60 Degrees

750 pounds at the outermost rung of the fly section or 2,000 pounds evenly distributed

60 Degrees to 75 Degrees

1000 pounds at the outermost rung of the fly section or 2,500 pounds evenly distributed

Y\_\_\_\_ N\_\_\_\_

**LADDER OPERATIONS WITH 1000 GPM WATER FLOWING**

The following capabilities are based upon continuous 360-degree rotation and up to full extension. The aerial ladder and water system shall be designed to permit the following flows:

1,000 GPM

90-degrees to the side of the ladder centerline

1,000 GPM

135-degrees down from a line parallel to the centerline

FLOW / ELEVATION

CAPABILITIES

-10 Degrees to 45 Degrees

500 pounds at the outermost rung of the fly section or 750 pounds evenly distributed

45 Degrees to 60 Degrees

500 pounds at the outermost rung of the fly section or 1,500 pounds evenly distributed

60 Degrees to 75 Degrees

500 pounds at the outermost rung of the fly section or 2,000 pounds evenly distributed

The above ratings shall be based on average weight of personnel on the ladder at 250 pounds each.

The ladder meets the 2:1 safety factor requirement for material based on the weight of the ladder plus a 500 pound live load at the tip of the aerial, and flowing 1,000 GPM of water at 90 degrees to the side of the platform at zero degrees elevation.

If a monitor is ordered that can elevate above 0 degrees the tip load shall be reduced to 250 lbs.

Y\_\_\_\_ N\_\_\_\_

**4" WATERWAY SWIVEL**

There shall be a 4" waterway swivel with 360 degrees continuous rotation. It shall be installed through the turntable and torque box to connect the aerial waterway plumbing from the water pump to the aerial. The hydraulic oil for the aerial shall be directed through a six-port hydraulic swivel with 360 degrees continuous rotation.

Y\_\_\_\_ N\_\_\_\_

**TELESCOPING WATERWAY -- AERIAL**

An aerial waterway shall be provided from the base of the aerial device to the tip of the fly section. The aerial telescoping aluminum waterway shall be fabricated of aluminum and shall have three (3) tubes as follows:

- 4-1/2" outside diameter at the base section

- 4" outside diameter at the middle section
- 3.5" outside diameter at the fly section.

Y\_\_\_\_ N\_\_\_\_

**MONITOR INSTALLATION & RETRACTABLE**

The monitor connected to a waterpan and shall be retractable allowing the monitor to be secured at the tip of the fly section for water tower operations or at the end of the next lower section for rescue operations. When the aerial is fully retracted the monitor lock shall be quickly movable and easily accessible at the tip of the aerial.

The rescue mode feature shall allow the tip of the fly section to be placed very close to the edge of a building or window minimizing the working and access heights on and off the ladder tip without worrying about the monitor being damaged.

Monitor controls shall be located on the retractable waterway pan and on the aerial control console. The retractable waterway pan electrical cable shall be guided by e-chain for protection of the cable when repositioning the monitor from the fly section to the next lower section. No manual hand plugs, external reels, or coiled self-retracting cable shall be needed. All electrical connections shall be directly connected to the monitor.

Y\_\_\_\_ N\_\_\_\_

**RELIEF & DRAIN VALVE -- WATERWAY SYSTEM**

A 2-1/2" preset relief valve shall be placed in the aerial waterway system and shall be capable of the dumping of water to the environment to protect the waterway system.

One (1) 1-1/2" quarter turn drain valve shall be installed at the low point of the waterway plumbing system.

Y\_\_\_\_ N\_\_\_\_

**DUAL DISPLAY AERIAL WATERWAY FLOW METER**

One (1) Fire Research Insight model DF400 digital flowmeter shall be installed. The flowmeter shall include a dual display module, paddlewheel flow sensor, sensor housing with saddle clamp, and a sensor cable. The flowmeter case shall be waterproof, manufactured of anodized machined aluminum, and have dimensions not to exceed 3 1/4" high by 3 1/4" wide by 2 1/2" deep. It shall have an LED display with super bright digits more than 1/2" high. Flow rate shall be displayed in gallons per minute.

The flowmeter program features shall be accessed via push buttons on the front of the module. The program shall support multiple calibration points to correct for nonlinear flow, set points for high and low flow warnings, and summing and totalizing functions.

Y\_\_\_\_ N\_\_\_\_

**WATERWAY SUPPLY PLUMBING FROM PUMP TO REAR**

Plumbing shall be installed from the fire pump through a tee at the aerial waterway and to the rear of the truck. A 4" aluminum pipe shall be installed in the torque box with 4" Victaulic couplings on both ends. The rear waterway inlet/outlet shall connect from the tee at the aerial waterway swivel and continue to the back of the truck and under the torque box. The inlet/outlet will be located to the right hand center of the vehicle.

Y\_\_\_\_ N\_\_\_\_

**2-1/2" GATED PRE-CONNECT DISCHARGE ON FLY SECTION**

One (1) 4" handwheel operated butterfly valve shall be installed between the end of the waterway and the monitor. The butterfly valve shall direct water flow from the waterway to the 2-1/2" pre-connect discharge. A 2-1/2" quarter turn ball valve shall be installed ahead of the 2-1/2" pre-connect discharge. The 2-1/2" pre-connect discharge shall have a NH male thread with a 2-1/2" female to 1-1/2" NH male thread and shall be mounted on the retractable waterway pan. One (1) 1-1/2" cap and chain shall be supplied with pre-connect.

Y\_\_\_ N\_\_\_

### **AERIAL COMMUNICATION SYSTEM**

A Fire Research Intercom model ICA200 two-way system shall be installed. The two station intercom communication system shall have the master station at the turntable and secondary intercom and speaker at the tip of the aerial.

The master station shall have a volume control and a push-to-talk button. The remote station shall operate "hands free" and constantly transmit to the master station and speaker, unless the master station push-to-talk button is pressed.

The intercom shall be designed for exterior aerial application. Each station shall have a weather resistant and protective housing and water resistant speakers.

Y\_\_\_ N\_\_\_

### **TRACKING LIGHTS -- 12 VOLT BASE SECTION**

Two (2) Collins model #CD-FX-HID-1 spotlights shall be installed at the lower end of the base section ahead of the lift cylinders of the ladder. The lights shall have spot type bulbs. These are to be activated from the tracking light switch on the main control station and from a switch on the lamp head.

Y\_\_\_ N\_\_\_

### **LADDER BED-CRADLE LIGHTS**

LED Strip lights, 12V shall be located on the aerial travel support. The lights shall be activated by the aerial master switch.

No 12V Tip Lights on the Fly Section

Y\_\_\_ N\_\_\_

### **120 VOLT RECEPTACLE -- FLY SECTION**

One (1) 120-volt AC circuit shall be run through the collector ring swivel, with a 20 amp receptacle mounted on the tip of fly section. The receptacle(s) shall be a twist-lock three prong type with a weather proof cover.

Y\_\_\_ N\_\_\_

### **TIP MARKER LIGHTS -- FLY SECTION**

Two (2) amber Whelen LED lights, model # 70A02FCR, shall be installed at the tip of the fly section. These lights shall be activated from the tip light switch on the turntable.

Y\_\_\_ N\_\_\_

### **LADDER SECTION LIGHTING**

Each aerial section shall be equipped with 12-volt LED luma-bar lighting. The luma-bar shall run the full length of the climbing portion of each section. These lights shall be activated from the turntable tracking light switch. The ladder rung lights shall be "blue" in color.

Y\_\_\_\_ N\_\_\_\_

### **CAB TILT AERIAL INTERLOCK**

Two (2) proximity switches shall be installed on the aerial boom support, one (1) each side, to inhibit cab tilt unless the aerial is raised from the ladder travel support.

Y\_\_\_\_ N\_\_\_\_

### **HYDRAULIC SYSTEM**

The hydraulic system shall have a load sensing, variable gallonage, hydraulic piston pump with an integral pressure control. To reduce the normal time for aerial set up, the hydraulic pump shall be of the load sensing design. The hydraulic system shall have sufficient oil flow to provide the capability of performing multiple functions simultaneously without reducing operating speeds of the selected functions.

The hydraulic oil for the aerial shall be directed through a hydraulic swivel with 360 degrees continuous rotation. Enclosed in the hydraulic swivel shall be a minimum of twenty (20) electrical collector rings and a maximum of thirty-six (36) electrical collector rings with 360-degrees continuous rotation.

The hydraulic pump shall be large enough to provide oil to meet all of the requirements needed for aerial and outrigger operation standards.

A pressure relieving valve set at 500 PSI above the system pressure shall be integral in the pulsar control valve to protect the hydraulic pump. This pressure reducing valve shall be a safety device for hydraulic pump failure. The hydraulic oil shall be directed through high pressure hydraulic hose and tubing.

The hydraulic system shall be designed to direct oil to the outriggers only while the ladder is in the bedded position. The oil can be directed to the aerial operation only when all of the outriggers are supporting sufficient load. This operation is made available through the use of electrical diverter valves with a manual override system for safety backup.

Y\_\_\_\_ N\_\_\_\_

### **HYDRAULIC SYSTEM INSTALLATION**

The non-sealing moving parts of all hydraulic components, whose failure results in motion of the aerial device, shall have a minimum bursting strength of four times the maximum operating pressure to which the component is subjected.

Dynamic sealing parts of all hydraulic components, whose failure results in motion of the aerial device, shall not begin to extrude or otherwise fail at pressures at or below two times the maximum operating pressure to which the component is subjected.

Static sealing parts of all hydraulic components, whose failure results in motion of the aerial device, shall have a minimum bursting strength of four times the maximum operating pressure to which the component is subjected.

All hydraulic hose, tubing, and fittings shall have a minimum bursting strength of at least three times the maximum operating pressure to which the components are subjected.

All other hydraulic components shall have a minimum bursting strength of at least two times the maximum operating pressure to which the components are subjected.

The hydraulic system shall be provided with an oil pressure gauge at the control station position.

Y\_\_\_\_ N\_\_\_\_

### **HYDRAULIC RESERVOIR**

The hydraulic system shall be supplied by a 30 gallon oil tank with a 100 mesh filter on the pump inlet side.

A means for checking and filling the hydraulic reservoir shall be readily accessible.

The fill location shall be conspicuously marked with a label that reads "Hydraulic Oil Only."

Instructions for checking and filling the hydraulic reservoir shall be provided.

The hydraulic system components shall be capable of maintaining, under all operating conditions, oil cleanliness and temperature that comply with the component manufacturer's recommendations.

Y\_\_\_\_ N\_\_\_\_

### **LEVEL SENSOR**

The hydraulic reservoir shall be equipped with a sensor that will indicate in the cab if the oil level is low.

Y\_\_\_\_ N\_\_\_\_

### **HYDRAULIC DRAIN LINE**

One (1) quarter turn shut-off valve shall be connected in the drain line of the hydraulic oil tank.

Y\_\_\_\_ N\_\_\_\_

### **HYDRAULIC OIL VALVE CONTROL**

One (1) quarter turn shut-off valve shall be supplied between the suction line of the hydraulic oil tank and the inlet of the hydraulic pump.

Y\_\_\_\_ N\_\_\_\_

### **HYDRAULIC SYSTEM -- ELEVATION SYSTEM**

The hydraulic elevation system shall have two (2) 5" inside diameter cylinders that have 2-1/2" diameter rods and a 30" stroke. The elevation system shall elevate the aerial from -10 degrees to +75 degrees. The cylinders shall be equipped with spherical bushings to minimize cylinder rod wear. Each cylinder shall have lock valves connected directly to the barrel of the cylinder.

A pressure-reducing valve shall limit the force of the aerial when lowering and the system pressure limits the force when elevating the aerial.

Y\_\_\_\_ N\_\_\_\_

### **EMERGENCY HYDRAULIC SYSTEM -- 12VOLT**

An emergency hydraulic system shall be provided for capability for limited ladder functions and to stow the ladder and outriggers in case of prime motor failure.

The emergency system shall be powered from the 12-volt electrical system from the apparatus battery system and shall not be load managed.

Y\_\_\_\_ N\_\_\_\_

**TIP LIGHTS - 240 VOLT FLY SECTION LED**

Fire Research Spectra Max LED Scene Light SPA570-J28 top mount fixed pedestal light shall be installed on each side of the tip of the aerial. The pedestal shall allow the lamphead to rotate 450 degrees and have a self-adjusting friction brake to prevent arbitrary rotation. The pedestal shall have a round mounting base. Wiring shall extend from the pedestal bottom.

The lamphead shall have 84 ultra-bright white LEDs, 72 for flood lighting and 12 to provide a spot light beam pattern. It shall operate at 240 VAC, draw 1.4 amps, and generate 28,000 lumens of light. The lamphead shall have a unique lens that directs flood lighting onto the work area and focuses the spot light beam into the distance. The lamphead angle of elevation shall be adjustable at a pivot in the mounting arm and the position locked with a round knurled locking knob. The lamphead shall be no more than 5 3/8" high by 14" wide by 3 3/4" deep and have a heat resistant handle. The lamphead and mounting arm shall be powder coated. The LED scene light shall be for fire service use.