The City of Henderson

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001Finance Department

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November 16, 2016

INVITATION TO BID

Bid Reference No. 16-31

Competitive sealed bids will be received by the City of Henderson, Kentucky for the following:

Aerial Apparatus

Bids will be accepted in the Office of the Director of Finance, 222 First Street, Henderson, Kentucky, 42420, until 1:30 p.m., prevailing local time, on Monday, December 5, 2016, at which time the bids will be publicly opened and read.

The bids are being solicited pursuant to KRS 45A.365.

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INSTRUCTIONS TO BIDDERS

1. Each bid must be signed by the bidder with his usual signature. Bids by a Partnership must be signed with the partnership name by one of the members of the partnership, or by an authorized representative, followed by the signature and title of the person signing. Bids by Corporations must be signed with the name of the corporation, followed by the signature and designation of the president, secretary, or person authorized to legally bind the corporation.

2. Bids must be received prior to the specified time of closing as designated in the invitation. Bids received late will be returned unopened to the bidder.

3. Envelopes must be sealed when submitted and must be properly noted with the bid reference number. Separate bids must be submitted for each reference number.

4. Bids containing erasures or corrections thereon will be rejected unless said erasures or corrections are noted over the initials or signature of the bidder.

5. Bids may be submitted on any one item or any group of items unless otherwise stated herein. The unit price must be shown for each item or group of items as requested.

6. References in the *Technical Specifications* describing the material, supplies, or services required of a particular trade name, catalog or model number are made for descriptive purposes to guide the bidder in interpreting the type of material or supplies or nature of the work described. They should not be construed as excluding offers on other type of materials and supplies or of performing the work in a manner other than specified. However, the bidders attention is called to Paragraph 6 of the *General Conditions* which must be strictly adhered to.

7. Bids are to be mailed to or delivered to the Office of the Director of Finance, Henderson Municipal Center, 222 First Street, PO Box 716, Henderson, Kentucky 42419.

8. The City's sales tax exemption status may not be used by the bidder to acquire materials or supplies on a sales tax exempt basis. Any sales taxes or other taxes incurred by the bidder remain the responsibility of the bidder. It is assumed that all such costs incurred by any bidder are included in his bid price.

- End of Section -

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GENERAL CONDITIONS

1. The City of Henderson reserves the right to reject any and all bids, and unless otherwise specified by the bidder, to accept any item or group of items in the bid. In case of error in extending the total amount of the bid, the unit price will govern.

2. The City of Henderson's payment terms are net thirty (30).

3. In case of default by the bidder or contractor, the City of Henderson may procure the articles or services from other sources and hold the bidder or contractor responsible for any excess cost occasioned thereby.

4. Prices shall be stated in units of quantities specified.

5. Prices quoted, unless otherwise stated by bidder, will be considered as being based on delivery to destination as designated and to include any charges for packing, crating, containers, etc., and being in strict accordance with specifications as shown.

6. Whenever a reference is made in the specifications or in describing the materials, supplies or services required, or a particular trade name, manufacturer's catalog, or model number, the bidder, if awarded a contract, will be required to furnish the particular item referred to in strict accordance with the specifications or description unless a departure or substitution is clearly noted and described in the proposal by the bidder.

7. The bidder, if awarded an order or contract, agrees to protect, defend, and save harmless the City against any demand for the use of any patented materials, process, article, or device, that may enter into the manufacture, construction, or form a part of the work covered by either order or contract and he further agrees to indemnify and save harmless the City from suits or actions of every nature and description brought against it, for or on account of any injuries or damages received or sustained by any party or parties, by or from any of the acts of the contractor, his servants, or agents.

8. Samples, when requested, must be furnished free of expense prior to the opening of bids and if not destroyed will, upon request, be returned at the bidder's expense.

9. Terms and conditions, unless stated otherwise herein, are to be effective for one year from the date of bid acceptance by the City Commission.

10. All bids shall remain valid for a period of thirty days after bid opening unless a longer period is otherwise stated herein.

11. Bidder may be required to obtain a City of Henderson Occupational License within ten days of contract award.

12. All federal, state, and local law requirements must be followed.

13. The City accepts responsibility of merchandise upon receipt at the City's delivery point unless otherwise noted herein.

14. Prior to a contract being awarded to the lowest responsible and responsive bidder whose bid meets specifications, a resident bidder of the Commonwealth shall be given a preference against a nonresident bidder registered in any state that gives or requires a preference to bidders from that state. The preference shall be equal to the preference given or required by the state of the nonresident bidder.

    Bids will be evaluated and awarded on the following basis (*as marked*):

    [ ] Lowest Bid Price; or

    [X] Lowest Evaluated Bid Price. The objective measurable criteria for this evaluation are enclosed.

    "Responsible bidder" means a person who has the capability in all respects to perform fully the contract requirements, and the integrity and reliability which will assure good faith performance.

15. *Special Conditions*, if any, are enclosed. A conflict between *Special Conditions* and *General Conditions* shall be construed in favor of the *Special Conditions.*

16. Prevailing Wage Requirements*:* Pursuant to KRS Chapter 337.505 to 337.550 and federal Davis-Bacon and Related Act Requirements, prevailing wages must be paid by the successful contractor and all of his subcontractors for certain construction contracts. If applicable, a Wage Decision will be enclosed that establishes the minimum rate that must be paid under the contract. Contractor certification concerning labor standards and prevailing wage requirements, ongoing payroll documentation, and other information will also be required for contracts that must comply with prevailing wage requirements.

17. The *Description of Requirements and Specifications (technical specifications)* for the procurement are enclosed herewith.

18. Conflict of interest -- Gratuities and kickbacks -- Use of confidential information. (KRS 45A.455)

    (1) It shall be a breach of ethical standards for any employee with procurement authority to participate directly in any proceeding or application; request for ruling or other determination; claim or controversy; or other particular matter pertaining to any contract, or subcontract, and any solicitation or proposal therefore, in which to his knowledge:
        (a) He, or any member of his immediate family has a financial interest therein; or
        (b) A business or organization in which he or any member of his immediate family has a financial interest as an officer, director, trustee, partner, or employee, is a party; or
        (c) Any other person, business, or organization with whom he or any member of his

immediate family is negotiating or has an arrangement concerning prospective employment is a party. Direct or indirect participation shall include but not be limited to involvement through decision, approval, disapproval, recommendation, preparation of any part of a purchase request, influencing the content of any specification or purchase standard, rendering of advice, investigation, auditing, or in any other advisory capacity.

(2) It shall be a breach of ethical standards for any person to offer, give, or agree to give any employee or former employee, or for any employee or former employee to solicit, demand, accept, or agree to accept from another person, a gratuity or an offer of employment, in connection with any decision, approval, disapproval, recommendation, preparation of any part of a purchase request, influencing the content of any specification or purchase standard, rendering of advice, investigation, auditing, or in any other advisory capacity in any proceeding or application, request for ruling or other determination, claim or controversy, or other particular matter, pertaining to any contract or subcontract and any solicitation or proposal therefore.

(3) It is a breach of ethical standards for any payment, gratuity, or offer of employment to be made by or on behalf of a subcontractor under a contract to the prime contractor or higher tier subcontractor or any person associated therewith, as an inducement for the award of a subcontract or order.

(4) The prohibition against conflicts of interest and gratuities and kickbacks shall be conspicuously set forth in every local public agency written contract and solicitation therefore.

(5) It shall be a breach of ethical standards for any public employee or former employee knowingly to use confidential information for his actual or anticipated personal gain, or the actual or anticipated personal gain of any other person.

Effective: April 9, 1980

History: Amended 1980 Ky. Acts ch. 250, sec. 16, effective April 9, 1980. -- Created 1978 Ky. Acts ch. 110, sec. 92, effective January 1, 1980.

- End of Section –

06-01-14D

City of Henderson, Kentucky
Invitation to Bid

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SPECIAL CONDITIONS

The City of Henderson is soliciting sealed bids for purchase of an aerial apparatus.

1. General Requirements

Only manufacturers who fabricate their own apparatus chassis, cab, and body will be considered. The apparatus must be built and painted in a facility owned and operated by the bidder by a staff that is directly employed by the bidder. At least 15 units, similar to the type described herein, must have been sold and delivered within the past year. The competency and responsibility of bidders will be considered in making the award. These specifications, together with any other documents required herein, will be included in the final contract. Each bidder will submit a copy of his proposed contract form. If a vendor represents more than one Fire Apparatus Company, they will only bid the top of the line that meets specifications. Bids will not be considered from firms, individuals or the same owners of separate companies submitting more than one bid.

The body is to be completely built, painted, and installed by the prime body manufacturer, which minimizes third party involvement on engineering, design, service, and warranty issues. Apparatus using a subcontracted body will not be acceptable. The purchaser reserves the right to reject any or all bids, or to reject the bid of the bidder who, in the judgment of the buying authority is not in a position to perform the contract. The purchaser will not accept any bids, which do not meet these specifications and is the sole decider to deem which bid is in the best interest of the purchaser. The purchaser reserves the right to reject a bid based on unacceptable provisions of a bidder's contact and does not obligate itself to accept the lowest or any bid.

All specifications contained herein are considered minimum requirements for the manufacture and delivery of the "new" apparatus chassis and body specified herein. The terms "minimum" and "maximum" shall define the respective constraints that apply to the overall design, dimensions or quality level established by the City of Henderson, hereafter called "purchaser". The term "or equivalent" shall define the degree of determined quality level and shall be the sole responsibility of the purchaser to judge whether the proposed "equivalent" submitted by the bidder meets the minimum established quality level. Where brand names are referenced, the bidder shall make all efforts to provide that specified item; any substitutions shall be of equivalent or higher quality and shall be specifically noted by the bidder.

The specified apparatus shall comply with all Federal, State, and local requirements pertaining to vehicles used as emergency vehicles. All standards in effect at the time a contract is released to the successful bidder are to be met, whether or not they are specified herein. The apparatus shall conform to the National Fire Protection Association (NFPA) Standard for Automotive Fire Apparatus, Number 1901, the most current edition,

unless otherwise specified in this document. Only the specified fire service apparatus and equipment listed in these specifications shall be provided. The apparatus shall further conform to all Federal Motor Vehicle Safety Standards (FMVSS) applicable at the time of manufacture.

2. Intent of Specifications

It shall be the intent of these specifications to cover the furnishing and delivery of a complete apparatus equipped as hereinafter specified. These specifications cover only the general requirements as to the type of construction and test to which the apparatus shall conform, together with certain details as to finish, equipment and appliances with which the successful bidder shall conform. Minor details of construction and materials, which are not otherwise specified, are left to the discretion of the contractor, who shall be solely responsible for the design and construction of all features. Loose equipment shall be provided only as stated in the following pages. It is the intent of the technical specifications contained herein to ensure the custom cab and chassis specified shall be engineered, designed, and manufactured exclusively for heavy-duty continuous use in extreme environments and rigorous adverse conditions. Each custom cab and chassis shall be manufactured in strict compliance with all applicable requirements as set forth in the current edition of the NFPA (National Fire Protection Association) pamphlet 1901 with maximum safety as the key focus throughout the design and development phase of each fire and rescue chassis. All bids shall remain valid for a period of 60 days after bid.

3. Substitutions

Substitutions may be permitted provided they are equal or superior to that specified and provided they are listed and fully explained on a separate page. All substitutions shall be stated no matter how seemingly minor. Any substitutions not taken shall be assumed by the purchaser to be included in the proposal, regardless of the cost to the bidder.

Certified engineering performance information and thickness of materials will be furnished in the bidder's specifications. All specifications herein contained are considered as minimum. No exceptions to these minimum standards will be allowed relating to gauge, alloy, and type of metal, size of compartments and overall design. Bidders must state the brand of any item provided which is a substitute for the brand or model specified for evaluation by the bidder. The buyer reserves the right to require a bidder to provide proof in each case that a substituted item is equal to that specified. The buyer will be the sole judge in determination of acceptable substitutes. Submit only one bid that meets or exceeds the minimum specifications herewith. No substitutes, stock units, or alternates will be permissible unless such units are requested later in the specifications. If this is done, then the bidder will be automatically disqualified.

EXCEPTIONS

These specifications are based upon design and performance criteria, which have been developed by the fire department resulting from extensive research and careful analysis. Subsequently these specifications reflect the only type of fire apparatus that is acceptable at this time. Therefore, major exceptions to specifications will not be accepted. The bidder will make accurate statements as to the apparatus weight and dimensions. All bids will include a complete set of detailed manufacturer's specifications. The purchaser's

standards for bidding Automotive Fire Apparatus must be strictly adhered to, and all bid forms and questions must be complete and submitted with the bid. Omissions and variations will result in immediate rejection of the bid. To the right side of each paragraph of the fire department specifications, the bidder will state "Yes" or "No" indicating compliance with the specifications. All deviations, no matter how slight, will be clearly explained on a separate cover sheet entitled "Exceptions to Specifications". Any exceptions or variations to these specifications must be set forth on separate sheets, indicating page number(s) of the specifications, and must be submitted with the bid. Any bids deemed as taking total exception to these published specifications will result in immediate rejection of the bid. Proposals that are found to have deviations without listing them will be rejected. No prototype apparatus will be considered and all design, operational and material features must fully comply with the State and Federal Motor Vehicle Safety Standards.

4. Bid Response

Bids shall be enclosed in a sealed packet endorsed on the outside of the envelope "Bid 16-31 for Aerial Apparatus", pursuant to specifications provided, with the name of the bidder prominently displayed on the face of the packet. All bids shall be delivered at or before the time and place stated herein. Bids received after the stated date and time will be returned unopened to the bidder.

The bidder shall respond using only those forms contained herein. Any substitution shall be described in detail on a separate page attached to the bid response entitled "Substitutions". Substitutions shall be listed by specification reference number, corresponding bid page number, and detailed description of substitution, in column form. Failure to disclose a substitution will indicate total compliance. Final determination of acceptability of any substitution will be at the sole judgment of the purchaser.

Each bid must be accompanied by a set of detailed construction specifications consisting of a detailed description of the apparatus and equipment proposed. All bid specifications must be in the same sequence as the advertised specification for ease of comparison. These specifications shall include size, location, type and model of all component parts being furnished. Detailed information shall be provided on the materials used to construct all facets of the apparatus body. Terms such as "intent of" are considered vague and unacceptable responses and will disqualify the bid.

If the bid is submitted by a dealer/agent in the name of a particular manufacturer, the bidder will include in the bid proposal, a copy of the appropriate Letter of Authorization, authorizing the dealer/agent to sign on behalf of the manufacturer.

5. Withdrawal of Bids

Bids may be withdrawn any time prior to the bid opening. This may be accomplished by submitting such request in writing on the issuing company's letterhead either in person, by certified mail or facsimile. No bids may be withdrawn after the established bid opening date or time, unless the purchaser has extended the opening date.

6. Service and Warranty/Product Liability
   The bidder shall supply information in this bid for the service and warranty work that may be needed. Information provided shall include at a minimum the service company that will be performing the work, address of the service company, and a phone number for contact. The bidder, if his bid is accepted will defend against all suits, and assume all liability for the use of any patented process, advice or article forming a part of the apparatus of any appliance furnished under contact. Each bidder will supply proof of product liability and facility insurance equal to or exceeding $25,000,000.00.

7. Materials
   Materials shall conform to the specifications listed herein. When not specifically listed, materials shall be of the best quality for the purpose of commercial practice. Materials shall be free of all defects and imperfections.

8. Compliance
   Should any components of the accepted bid be found noncompliant at the time of delivery and that component was not substituted and accepted by the purchaser at the time of contract award, the bidder shall be liable for all cost associated with correction. Final acceptance of the apparatus will not be made, nor any payments executed, until such time as all discrepancies are corrected to the satisfaction of the purchaser. If the discrepancies are not corrected within ten business days of initial delivery attempt, the bidder may be deemed in default of contract.

9. Pre-Construction Conference
   Immediately after notification of contract award, the successful bidder shall schedule a pre-construction conference between the appointed representatives of the purchaser and the contractor. The conference shall be held not later than 30 calendar days after notification, at a location deemed by the purchaser. The conference shall be held at the manufacturer's facility with up to seven representatives of the Fire Department and appropriate representatives of the manufacturer. The contractor shall present a set of construction drawings and line item production order complying with the specifications outlined herein. Should the purchaser deem that the contractor has not properly interpreted the specifications or does not intend to manufacture the emergency support vehicle as specified, appropriate corrective actions shall be agreed upon and the conference shall be rescheduled within 30 calendar days. Should the purchaser determine, at the second conference, that the contractor remains unable to meet the specifications of the contract; the contract may be deemed null and void. A pre-construction conference shall be held prior to the actual construction of the vehicles. The conference shall be held at the manufacturer's facility with up to eight representatives of the Fire Department and appropriate representatives of the manufacturer.

10. Purchaser Inspections
    The purchaser shall be permitted to perform inspections at the following stages of construction: frame and chassis post modification (if any), pre-paint, and pre-delivery, mid-point, and final. All inspections shall be made at the bidder's facility. Any defects, imperfections, poor workmanship, or non-compliance of specifications, as may be deemed by the purchaser shall be corrected by the bidder, at the bidders cost, prior to the

next stage of construction or delivery. There will be a mid-point inspection for three representatives of the buying authority at the facility where the apparatus is being constructed. The customer shall specify when the inspection will occur. Factory and Sales representatives will be available at the time of inspection. There will be a final inspection for up to eight representatives of the buying authority at the facility where the apparatus is being constructed. The inspection trip will be completed when the apparatus is complete. Factory and Sales representatives will be available at the time of inspection. The final inspection will include the following aspects at a minimum:

- Full access to the build file and factory personnel to provide answers for any issues found.
- Unit will be placed on a lift that will allow full inspection of the undercarriage.
- Road test shall be accommodated.
- Unit will be taken to pump test area where the pump and plumbing can be inspected while flowing water.
- General apparatus orientation and operation shall be provided at the pump test pit.

11. Delivery and Transportation

The successful bidder shall state the time required for delivery of the completed apparatus on the Bid Pricing Sheet. Delivery is expected within a maximum of 240 days from bid award date, and the apparatus shall be delivered within 300 calendar days after receipt of the approved signed off pre construction changes. The manufacturer shall not be held liable for changes arising from its failure to make or delay in making delivery because of fire, flood, strike, riot, chassis shortage, accidents, acts of God, or any circumstances beyond our control. The bid price shall include all delivery costs to the Henderson Fire Department. To insure proper break-in of all components while still under warranty, the apparatus shall be delivered over the road under its own power (rail and/or truck freight shall not be acceptable). The completed apparatus shall be delivered to the purchaser with full instructions and onsite training provided to Fire Department personnel on operation, care and maintenance of apparatus and appurtenances at the purchaser's location. Such training shall be at bidder’s expense.

PRE-DELIVERY SERVICE

- After transportation from the factory, and immediately prior to delivery, the apparatus shall receive a pre-delivery service consisting of engine oil and filter change, chassis lubrication, fuel filter(s) changed, adjustment of engine to manufacturer’s specifications, complete inspection including all electrical and mechanical devices for proper operation, and correction of leaks or obvious problems. In addition, the unit shall be cleaned and fully detailed. The reason for the pre-delivery service is to prepare the apparatus for delivery after it is driven from the factory. The engine oil and filters were installed when the chassis was constructed and have undergone a pump test as well as a drive from the facility. This also requires the local dealer to inspect for any leaks that might have developed, to check out all of the systems to ensure proper operation, and thoroughly clean the unit for delivery.
- If the location of the manufacturer is 300 miles or less, the service shall be performed six months after delivery. Sometimes the builder is extremely close to

the customer, and an oil change is unnecessary. When this is the case, it calls for the service to be done after the apparatus has been in service for six months.

12. Questions

Technical questions may be directed to Chris Watson at 270-831-1270 or 812-449-5188 (cell) or you may email him at ckwatson@cityofhendersonky.org. Procedural questions may be directed to Assistant Finance Director, Penny Hahn, at 270-831-4920 or you may email her at pnhahn@cityofhendersonky.org.

- End of Section -

06-01-14E

City of Henderson, Kentucky
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Bid Reference No. 16-31

LOWEST EVALUATED BID PRICE CRITERIA

References (of owners with similar apparatus) 5 points - 1.66 pts per positive feedback reference

A. Location_____
Owner_____
Phone #_____
Contact Person:_____
Email Address:_____

B. Location_____
Owner_____
Phone #_____
Contact Person:_____
Email Address:_____

C. Location_____
Owner_____
Phone #_____
Contact Person:_____
Email Address:_____

Purchase Price 30 points (The cost of the lowest bid will receive 30 points. The remaining bids will receive points by dividing the lowest bid by each their bid amount. They will receive the calculated percentage of 30 points. Lowest bid/bid x 30 points)

Apparatus Delivery Date 300 days or less 15 points - (270 Days or less 15points, 270-300 Days 10points, Every 10 days over 300 days deduct 2 points)

Product Demo to department 10points - HFD was able to demo the apparatus before date of bid opening

Meets Dept Criteria:

A. Mobility (cramp angle, jack spread, windshield cubic inches) **5points - 1.66 points per category after evaluation of bidders for best mobility**

B. Functionality 20 points total (5 **points per category)**

1. Vertical reach vs. maximum height **(1-5 scale for best evaluated reach)**
2. Maximum Horizontal Reach **(1-5 scale for best evaluated reach)**
3. Maximum degree of set up +/- up and down hill: **(1-5 scale for best evaluated reach)**
4. Tip loads (wet and dry) **(1-5 scale for best evaluated reach)**

Product Safety Features 5 points.

1. Crash Test results **0-2.5 scale for best evaluated results**
2. Air bag safety restraint system coverage**0 points for no Air Bags, 2.5 points Air Bag Coverage)**

Warranty and Service for all components 10 points (1-5 scale for best evaluated warranty)

- End of Section –

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TECHNICAL SPECIFICATIONS

INFORMATION REQUIRED WITH BID

A written review of the company, in chronological order, detailing the background of the manufacturer shall be provided as part of the bid proposal. The fire apparatus and equipment to be furnished in meeting these specifications must be the product of an established reputable fire apparatus manufacturer of five years or more. Each bidder will furnish satisfactory evidence of the manufacturer's ability to construct, supply service, parts and technical assistance for the apparatus specified. The bidder must state the location of the factory and full service center. The general construction of the apparatus will give due consideration to the nature and distribution of the load to be sustained and the general character of the service to which the apparatus is to be subjected when placed in service. The body will be modular in design and construction of the latest modern type, for transfer of body to another chassis without cutting or welding. Each bidder must submit a detailed proposal, which accurately specifies the construction method to be used in the apparatus. The purchaser will utilize this proposal to compare the unit proposed with the specifications. To facilitate comparison all bid proposal specifications will be submitted in the same sequence as the advertised specification for ease of comparison. Any bidder who fails to submit a set of construction specifications, or who photo copies and submits these specifications as their own construction details will be considered non-responsive. This will render such proposal ineligible for award. For the purpose of evaluation of the construction methods, components, and materials from various vendors the make up the apparatus body, the Fire Department may request each bidder to supply a cross section of a side body compartment no smaller the ¼" in scale using full size components including the compartment door and hardware. The sample will remain with the fire department for a minimum of 14 days after the bid opening.

VIRTUAL MANUFACTURING

The manufacturer shall have a website available for the customers to "watch/view" their unit being produced. The "Trucks in Production" shall be updated a minimum of three times per week. The website shall also include documentation of cab and body crash tests, take a virtual tour of the production facility, videos of both current and new innovative products, updates on trade shows, photos of new deliveries and the opportunity to include customer 'Action Photo's'. Customer shall be able to access the website without the requirement of a password. Photos may be sent minimum of three times per week as an alternative.

INFORMATION/CERTIFICATIONS

The following information and original certifications will be required at time of delivery. This information will be supplied by the apparatus manufacturer:

(1) The manufacturer's record of apparatus construction details, including the following information:
- Owner's name and address
- Apparatus manufacturer, model, and serial number
- Chassis make, model, and serial number
- GVWR of front and rear axles
- Front tire size and total rated capacity in pounds (kilograms)
- Rear tire size and total rated capacity in pounds (kilograms)

- Chassis weight distribution in pounds (kilograms) with water and manufacturer-mounted equipment (front and rear)
- Engine make, model, and serial number, rated horsepower, related speed and governed speed
- Type of fuel and fuel tank capacity
- Electrical system voltage and alternator output in amps
- Battery make, model, and capacity in cold cranking amps (CCA)
- Chassis transmission make, model, and serial number; and if so equipped, chassis transmission PTO(s) make, model, and gear ratio
- Pump make, model, rated capacity in gallons per minute (liters per minute where applicable), and serial number
- Pump transmission make, model, serial number, and gear ratio
- Auxiliary pump make, model, rated capacity in gallons per minute (liters per minute where applicable), and serial number
- Water tank certified capacity in gallons or liters
- Foam tank (if provided) certified capacity in gallons or liters
- Aerial device type, rated vertical height in feet (meters), rated horizontal reach in feet (meters), and rated capacity in pounds (kilograms)
- Paint manufacturer and paint number(s)
- Company name and signature of responsible company representative

(2) Certification of slip resistance of all stepping, standing, and walking surfaces

(3) If the apparatus has a fire pump or an industrial supply pump, the pump manufacturer's certification of suction capability

(4) If the apparatus has a fire pump or an industrial supply pump, a copy of the apparatus manufacturer's approval for stationary pumping applications

(5) If the apparatus has a fire pump or an industrial supply pump, the engine manufacturer's certified brake horsepower curve for the engine furnished, showing the maximum governed speed

(6) If the apparatus has a fire pump or an industrial supply pump, the pump manufacturer's certification of the hydrostatic test

(7) If the apparatus has a fire pump or an industrial supply pump, the certification of inspection and test for the fire pump or the industrial supply pump

(8) The certification of inspection and test for the aerial device

(9) All the technical information, required for inspections to comply with NFPA 1914, Standard for Testing Fire Department Aerial Devices

(10) If the apparatus has a fixed line voltage power source, the certification of the test for the fixed power source

(11) If the apparatus is equipped with an air system, test results of due air quality, the SCBA fill station, and the air system installation

(12) Weight documents from a certified scale showing actual loading on the front axle, rear axle(s), and overall fire apparatus (with the water tank full but without personnel, equipment, and hose)

(13) Written load analysis and results of the electrical system performance tests required in Chapter 13

(14) When the apparatus is equipped with a water tank, the certification of water tank capacity

The Fire Apparatus Manufacture will also provide documentation of the following items for the entire apparatus and each major operating system or major component of the apparatus:

(1) Manufacturer's name and address

(2) Country of manufacture

(3) Source for service and technical information

(4) Parts replacement information

(5) Descriptions, specifications, and ratings of the chassis, pump (if applicable), and aerial device

(6) Wiring diagrams for low voltage and line voltage systems to include the following information:

- (a) Pictorial representations of circuit logic for all electrical components and wiring
- (b) Circuit identification
- (c) Connector pin identification
- (d) Zone location of electrical components
- (e) Safety interlocks
- (f) Alternator-battery power distribution circuits
- (g) Input/output assignment sheets or equivalent circuit logic implemented in multiplexing systems

(7) Lubrication charts

(8) Operating instructions for the chassis, any major components such as a pump or aerial device, and any auxiliary systems

(9) Precautions related to multiple configurations of aerial devices, if applicable

(10) Instructions regarding the frequency and procedure for recommended maintenance

(11) Overall apparatus operating instructions

(12) Safety considerations

(13) Limitations of use

(14) Inspection procedures

(15) Recommended service procedures

(16) Troubleshooting guide

(17) Apparatus body, chassis, and other component manufacturer's warranties

(18) Special data required by this standard

(19) Copies of required manufacturer test data or reports, manufacturer certifications, and independent third-party certifications of test results

(20) A material safety data sheet (MSDS) for any fluid that is specified for use on the apparatus

(21) One copy of the latest edition of FAMA's Fire Apparatus Safety Guide

The Fire Apparatus Manufacture shall deliver with the apparatus all manufacturers' operations and service documents supplied with components and equipment that are installed or supplied.

PRINCIPAL DIMENSIONS
The apparatus shall have the following dimensions:
Overall Length: minimum 39.5 feet
Overall Height: maximum 12 feet

FRONT BUMPER
There shall be an 80,000 PSI high tensile strength painted steel bumper provided. The bumper shall be painted according to departments color red with a black ruggedized material on top surface and lip.

RECESSED BUMPER POCKETS
The front bumper ends shall have recessed pockets to allow for mounting of warning lights.

LIGHTS, UNDER BUMPER
There shall be two 4" round clear LED waterproof lights mounted, one each side under the front bumper illuminating the area below. The lights shall automatically activate when any cab door is opened and by a switch located in the cab.

TOW HOOKS, FRONT
Two tow hooks shall be mounted to the bottom of the front bumper frame extension rails. The hooks shall be painted with a black ruggedized material. The tow hooks shall be attached with grade eight bolts.

FRONT BUMPER EXTENSION
There will be a 28" frame extension (or necessary extension) from the front face of the cab. The extension shall be made from heavy-duty steel in both C-channel and tubular shapes. Extension shall be bolted to the chassis frame rails through reinforcement plates, backed by the engine mounting crossmember. Fasteners utilized shall be grade eight bolts.

GRAVELSHIELD
A gravelshield constructed of 1/8" embossed aluminum tread plate shall be installed above the frame extension between the bumper and the front face of the cab. The tread plate shall be painted with a black ruggedized material.

BUMPER COMPARTMENT, CENTER
There shall be a compartment provided in the front bumper gravelshield, centered between the frame rails fabricated of 1/8" smooth aluminum plate. This compartment shall be weather-sealed to protect from the outside environment.

COVER, CENTER FRONT BUMPER COMPARTMENT
The center bumper compartment shall have a hinged aluminum tread plate cover to secure the contents. The cover shall be secured in the closed position with a stainless steel latch. The cover shall be cut-out for access. This cover and all accessories shall be painted with a black ruggedized material. There shall be a light located within the compartment, activated when the compartment door is opened.

BUMPER COMPARTMENT, OFFICER'S SIDE
There shall be a compartment provided in the front bumper gravelshield, passenger's side fabricated of 1/8" smooth aluminum plate with drain holes to promote airflow.

COVER, OFFICER'S SIDE FRONT BUMPER COMPARTMENT
The officer's side bumper compartment shall have a hinged aluminum tread plate cover to secure the contents. The cover shall be secured in the closed position with a stainless steel latch. This cover and all accessories shall be painted with a black ruggedized material. There shall be a light located within the compartment, activated when the compartment door is opened.

SPEAKER, PASSENGER'S SIDE
There shall be one speaker shall be installed thru the front face of the bumper, passenger side, outboard. The speaker shall be 100 watts, wired to the electronic siren.

AIR HORN, PASSENGER'S SIDE
There shall be one 24" long Grover air horn installed in compliance with NFPA thru the front bumper, passenger's side, outboard of the frame rail. The air horn shall be plumbed to the chassis, air supply system thru an air protection valve, and manufactured from spun brass material with an easily separated die cast sounding unit for serviceability. The air horn shall be painted with a black ruggedized material.

AIR HORN, DRIVER'S SIDE
There shall be one 24" long Grover air horn installed in compliance with NFPA thru the front bumper, driver's side, outboard of the frame rail. The air horn shall be plumbed to the chassis, air supply system thru an air protection valve, and manufactured from spun brass material with an easily separated die cast sounding unit for serviceability. The air horn shall be painted with a black ruggedized material.

NATHAN TRAIN HORN
One Nathan train horn set shall be installed in a manner where it does not reduce ground clearance, and also where its installation will not interfere with the noise-dampening of the cab in ways where it would be difficult to hear radio traffic or in-cab communications among crew members during its activation. The train horn shall be active in “Response Mode” only.

MECHANICAL SIREN
One Federal Signal Q2B siren model Q2B-012NNSD electro-mechanical siren shall be installed thru the front bumper, driver's side outboard. The Q2B siren shall be a streamlined, chrome plated siren designed to provide reliable and long-life operation. The electro-mechanical siren shall produce the distinctive Q2B sound that is a registered trademark of Federal Signal, and shall be provided with a heavy duty clutch and an electric brake. The Q2B siren shall measure 10.5” high x 14” long x 10” deep and shall produce 123 decibels at 10’. The siren shall operate off the vehicle’s 12 volt system. The Q2B siren shall be recess mounted in the front of the vehicle. The siren shall be painted with a black ruggedized material. Two siren brake switches shall be installed: one within reach of the driver and one within reach of the officer.

SIREN WIRING
The siren activation switch shall be wired thru the chassis park brake and operate in the "Response Mode" only.

SIREN FOOT SWITCH
A foot operated switch shall be installed on the driver's side wired to the mechanical siren. The location will be determined at pre-build.

SIREN DASH SWITCH, OFFICER'S SIDE
A dash mounted switch shall be installed on the officer's side wired to the mechanical siren.

RECEIVER HITCH, BELOW FRONT BUMPER
One class three receiver hitch shall be installed below the front bumper centered between the frame rails utilizing grade eight bolts. There shall be one 12 volt Quick Connect, battery powered lead, wired to the chassis electrical system to supply a portable winch. The connector shall be located at the receiver location. A safety sign, FAMA28, shall be located on or near the receiver or anchor stating the maximum straight line pull rating.

RECEIVER HITCHES, LEFT/RIGHT SIDE OF BODY
Two class three receiver hitches shall be installed, one each side below the left and right side rear body compartments utilizing grade eight bolts. A safety sign, FAMA28, shall be located on or near each receiver or anchor stating the maximum straight line pull rating.

AIR HORN WIRING
The air horns shall be active in both the "Scene" and "Response Mode".

SWITCH, HORN/AIR HORN SELECTOR
A driver controlled horn/air horn selector switch shall be installed in the cab and operate either air horn or chassis electric horn through the horn ring button.

AIR HORN AND NATHAN TRAIN HORN SWITCHES
Dash mounted switches shall be installed on the officer's side wired to the air horn and train horns. A foot switch shall be installed on the driver’s side, next to the mechanical siren switch, to operate the train horn.

FRONT AXLE
The front axle shall be a Meritor MFS-20 with 23,000 pound capacity equipped with oil seals and transparent cover for oil level inspection.

CHASSIS WHEELBASE
The chassis wheelbase shall be minimum 238”.

CHASSIS FRAME RAILS
The chassis frame rails shall be constructed of 110,000 PSI minimum yield steel. The frame rails shall be powder coated in order to insure superior paint adhesion. Frame cutouts for the engine shall be made with a plasma torch in order to minimize the heat-affected zone caused by the cut. All frame-mounted components shall be secured with grade eight bolts with hardened washers and distorted thread locknuts. Flanged head bolts with nylon locking nuts, or huck bolts shall not be acceptable.

PAINT, FRAME RAIL
The chassis frame rails, cross members, fuel tank and air reservoirs shall be completely encapsulated in a ruggedized, protective coating. The air reservoirs, reservoir hanger straps and fuel tank shall all be treated separately prior to assembly. The frame, cross members, bumper backing reinforcement plate, radiator skid plate, spring hangers, cab lock mounts and required bolts shall all be in place prior to treatment to ensure complete coverage. The color of the protective coating shall be black.

STEERING SYSTEM
The steering system shall be a package certified by TRW for the application. All components after the steering column to the drag link shall be manufactured by TRW. The steering system shall use a TAS-65 steering gear with an RCS-55 slave gear, which has the capacity to static steer

the chassis loaded to 22,500 pounds with 425 size tires. The use of two equal size gears or a single gear with an assist cylinder shall not be acceptable.

CHASSIS ALIGNMENT
The chassis frame rails shall be measured to insure the length is correct and cross checked to make sure they run parallel and are square to each other. The front and rear axles shall be laser aligned. The front tires and wheels shall be aligned and toe-in set on the front tires by the chassis manufacturer. Cramp angle is set to achieve the greatest turning radius possible with the selected components of the vehicle. Each front wheel is set to 0°. The wheel is then turned until it reaches the steering stops. This measurement is the cramp angle.

FRONT SUSPENSION
The front suspension shall be parabolic (taper leaf) spring type with four leaves 23,000 pounds capacity. The leaves shall be a minimum of 4" wide x 54" long (flat), with grease fittings for lubrication installed in the spring pins. Axle stops with energy absorbing jounce bumpers shall be supplied on the spring top pad. Double acting Koni shock absorbers shall be provided on the front suspension.

FRONT BRAKES
The front axle shall be equipped with air operated disc brakes and ventilated rotors.

CRAMP ANGLE
The cramp angle of the front axle shall be minimum 41° to the left and right.

FRONT TIRES
The front tires shall be Michelin 425/65-R22.5 Load Range "L" G-296 MSA all-weather treads. The Intermittent Fire Service load capacity shall be 23,000 pound with a speed rating of 68 MPH when properly inflated to 120 PSI.

FRONT WHEELS
The front axle wheels shall be Alcoa Polished Aluminum for 425 tires with a rating of 23,000-pounds.

FRONT WHEEL TRIM
The front axle wheels shall be trimmed with stainless steel hub and lug nut covers. The axle's hub covers shall be equipped with holes for oil level viewing.

MUD FLAPS, FRONT
The front axle mud flaps shall be constructed from hard black rubber and installed behind the front axle.

TANDEM REAR AXLE
The rear tandem axle shall be a Meritor RT-58-185 with a 60,000 pound service rating. The axles shall be equipped with "Oil Bath" wheel end seals.

REAR SUSPENSION
The rear suspension shall be rated to match the capacity of the rear axle.

TANDEM REAR AXLE DIFFERENTIAL
The Meritor RT series rear axle shall have a standard differential in each axle.

VEHICLE TOP SPEED
The rear axle shall be geared for a top speed of 60 MPH at governed engine speed for vehicles over 50,000 GVWR.

REAR BRAKES
The rear tandem axles shall be equipped with S-Cam air operated brakes with automatic slack adjusters.

REAR TIRES
The rear tires shall be Michelin 315/80R 22.5 18 Ply "J" Regional RHD II Rocky Environment traction treads. The Intermittent Fire Service load capacity shall be 60,000 pound with a speed rating of 75 miles per hour when properly inflated to 125 pounds PSI with steel or aluminum wheels.

REAR WHEELS
The rear wheels shall be Alcoa Polished aluminum, 9" x 22.5" 10-bolt, hub-piloted. The outside wheels shall be polished on the outside surface.

REAR WHEEL TRIM
The rear axle wheels shall be trimmed with stainless steel "Lincoln Hat" hub and lug nut covers.

TIRE PRESSURE MONITORING SYSTEM
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 shall flash when the tire drops 8 PSI below the factory setting.

TIRE CHAINS, AUTOMATIC
The rear axle shall be equipped with an ON-SPOT automatic tire chain system. The system shall provide instant traction at the touch of a switch, without having to stop the vehicle. The driver's dash shall have an electric control switch, clearly labeled for operation of the tire chains. The switch shall be provided with a guard to prevent accidental deployment of the tire chains. The switch when activated shall open a frame mounted solenoid, allowing air from the chassis air system to enter the spring loaded air cylinder and lower the chain wheel. The rubber covered chain wheel shall contact the inside of the tire causing the chain wheel to rotate and deploy the chains. The ON-SPOT automatic chains shall have six lengths of chain, spaced at 60° intervals on the chain wheel, ensuring two chains between the tire and road surface for instant traction in slippery conditions whether accelerating, braking, or in a wheel lock up condition. The ON-SPOT chains can be activated with speeds of 2 MPH to 25 MPH. The ON-SPOT chains shall be operable in either forward or reverse for speeds up to 35 MPH. When the chains are no longer needed the process is reversed, the dash board switch is turned off and the air is exhausted from the cylinder. The return springs in the air cylinder brings the chain wheels back to their resting position.

VOGEL AUTOMATIC LUBRICATION SYSTEM
The chassis shall be equipped with a VOGEL Centralized Lubrication System. This system shall provide automatic grease application to the following wear points:

FRONT AXLE, SUSPENSION & STEERING
Kingpins (4), Tie Rods (2), S-Cams (2), Slack Adjusters (2), Spring Pins (6), Draglink (2), No Cab Tilt Pivots

REAR AXLE & SUSPENSION
S-Cams (2), Slack Adjusters (2), Spring Pins (2)

This grease system shall utilize NLGI000. The system shall be powered by an electrically driven gear pump, 12 volt 192 watts. The gear pump shall be mounted to a reservoir with a capacity of 2.7 liters. The pump is to operate against a back pressure of 38 bar nominal, with an output of 160 cc/min. Distribution to all lubrication points is by piston distributors. The distributors shall utilize metering nipples. Metering for the nipples shall be in the increments of 0.1, 0.2, 0.3, 0.4, 0.6, and 1.0 cc. The metering nipples shall be able to be field changed to provide a tailored grease application to the chassis points. The distributor shall dispense a metered volume of lubricant into the lube point after the electric motor gear pump has cycles to the off-time mode. The cycle time of the system shall be determined by an electronic controller, which regulates the on and off time of the pump. The controller shall permit the feedback of the pressure switch to highlight the end of the lube cycle.

ACCESSORIES

A hand pump and container of grease shall be shipped loose with the chassis for initial maintenance by the department.

HOSE AND HARNESS ROUTING

Battery cables, hydraulic hoses, and air lines shall be routed through the vertical face of the chassis frame rails using bulkhead connectors. The use of grommets through frame rails, as well as, running hoses or cables under, over or ahead of the chassis frame rails to achieve positive connections shall not be acceptable. For ease of maintenance, the wiring harnesses, hydraulic hoses and air hoses shall be divided down each frame rail. The hydraulic and air hoses shall be run, primarily, down the inside of the right side frame rail, while the electrical harnesses shall be run, primarily, down the left side frame rail. Harnesses and hoses shall be mounted using rubber coated, stainless steel holders, and, where necessary, heat resistant zip loom.

AIR BRAKE SYSTEM

The air brake system shall meet the requirements of FMVSS-121. The system shall consist of four reservoirs with a total capacity of 8,000 cubic inches. The system shall be of dual circuit and quick build up design powered by an engine mounted gear driven air compressor. The system shall be protected by a heated air dryer with heated automatic moisture ejector on the wet tank and quarter turn brass drain valves on the other tanks. The entire chassis air system shall be plumbed utilizing reinforced nylon air lines. All of the airlines shall be color coded to correspond with an air system schematic and shall be adequately protected from heat and chafing. The system shall be plumbed using color-coded nylon airlines with brass push-lock fittings.

ANTI-LOCK BRAKES W/ATC & ELECTRONIC STABILITY CONTROL

The apparatus shall have ABS-based Electronic Stability Control (ESC), which offers another level of vehicle control. This automatic braking management system reduces the possibility of a side rollover and assists in the directional stability of apparatus. Upon reaching critical lateral acceleration thresholds, the system intervenes to regulate the vehicles deceleration and braking functions. Reducing the engine's RPM by overriding the foot throttle input and applying the engine retarder (if equipped) to slow the apparatus giving the driver added control and maneuverability. The ESC shall also apply braking power to selective wheel of the front and rear axles to assist in stabilizing the apparatus to its intended direction. This selective braking application and reduction of speed and torque reduces the possibility of spinouts and side rollovers even in adverse conditions. The system includes a six channel Anti-Lock Braking System and shall be installed which includes six wheel sensors and four modulators to control and compensate braking force at each wheel. This system shall monitor all wheel ends regardless of suspension type, and which axle it sees braking forces first. An ABS warning light shall be installed on the driver's dash that remains illuminated until the vehicle is moving at least 4 MPH.

An ABS test switch shall be installed in the "Diagnostic Information Panel" that when pressed, sends the system into diagnostic mode causing the ABS light to blink (I/O) indicating a flash code. Automatic Traction Control (ATC) shall be installed to sense wheel slip, apply air pressure to brakes, and reduce engine torque to provide improved traction. An indicator light installed in the cab shall illuminate when the system is engaged. A mud and snow switch shall be provided. When the switch is in the "On" position, it shall allow momentary wheel slip to obtain traction under extreme mud and snow conditions. The system also includes a Steering Angle Sensor (SAS), which informs the system of the degree in which the steering is turned to one side or the other. Along with the SAS, an ESC module is mounted mid frame at the rear of the chassis cab to detect roll, pitch, and yaw angles and computes which wheel's brakes shall be acted upon.

AIR DRYER

The air system will include an air dryer with integral 12 volt heated moisture ejector. The air dryer shall have a desiccant cartridge and incorporate an integral turbo cutoff valve. The turbo cutoff allows the air dryer to purge water and contaminants without any loss of turbo boost or engine horsepower.

ENGINE

The vehicle shall be equipped with a (minimum) Cummins ISX12 (11.9) 500 turbocharged diesel engine. Standard features include an electronic governor, electronically controlled unit injectors, Farr air cleaner, a 12 volt starter Delco 39 MT, and an 18.7 CFM compressor. The oil filter shall be a full flow and bypass design. Engine is equipped with Exhaust Gas Recirculation. This engine conforms to the US 2016 EPA regulations for heavy-duty diesel engines.

ENGINE SPECIFICATIONS

- Model: ISX12 (11.9)
- Number of Cylinders: 6
- Bore and Stroke: 5.11" X 5.91"
- Displacement: of 12 (11.9) L
- Rated Horsepower: 500 @ 2000 RPM
- Peak Torque: 1645 @ 1200 RPM
- Governed Speed: 2100 RPM

TRANSMISSION

The chassis shall be equipped with an Allison 4000 EVS automatic transmission. It shall be equipped with 4th gear operating controls and programmed for Fire Apparatus vocation. An electronic oil level indicator shall be provided as well as a diagnostic reader port connection. The transmission shall be geared to provide one-to-one ratio in fourth gear for fire pump applications. This dedicated "lockup" circuit is provided for pump operation. The transmission fifth gear shall be an overdrive ratio, permitting the vehicle to reach its top speed at the governed engine speed. The transmission shall be equipped with an automatic neutral feature. Applying the parking brake shall command the transmission to neutral, regardless of drive range requested on the shift selector which shall require re-selecting the drive range to shift out of neutral. The transmission shall be equipped with dual PTO ports with engine speed capabilities. The transmission shall be cooled by the radiator-mounted heat exchanger. The transmission fluid shall meet Allison specification TES-295.

TRANSMISSION SHIFTER, PUSH BUTTON

The transmission shall be controlled by an Allison push button shifter internally illuminated for night operation. The shifter shall be mounted on the dash to the right of the steering column. The transmission shall be capable of five speed operation. 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 the shift selector. The sensor display shall provide the following checks, correct fluid level, low fluid level and high fluid level.

DRIVELINES

The chassis shall be equipped with a Neapco 1810 or equivalent series driveshaft with full round yokes and universal joints. The driveshaft tubing shall be a minimum of 4.50" in diameter with .134" wall thickness. The drivelines shall be balanced at a minimum of 3,000 RPM.

FIRE PUMP MOUNTING

Extra heavy-duty mounting brackets shall be bolted to the chassis frame rails for the installation of the fire pump. The mounting brackets shall be positioned aligning the pump insuring the angular velocity of the driveline joints are the same at each end allowing for full capacity performance with minimal vibration.

ENGINE COMPRESSION BRAKE

The engine shall come equipped with a Jacobs “C-Brake” compression brake. The brake shall be controlled by an On/Off and low/medium/high switches located in the cab. The compression brake shall interface with the anti-lock brake controller to prevent engine brake operation during adverse braking conditions. When activated, the Jacobs engine brake shall cut off the flow of fuel to the cylinders and alter the timing of the exhaust valves. This shall transform the engine into a high-pressure air compressor, driven by the wheels, and the horsepower absorbed by the engine in this mode shall slow the vehicle. The selector switch allows the driver to select the amount of retarding power. When the On/Off switch is in the “On” position, the engine brake shall be automatically applied whenever the accelerator is in the idle position and the automatic transmission is in the lock-up mode. If the accelerator is depressed or if the On/Off switch is placed in the “Off” position, the engine brake shall immediately release and allow the engine to return to its normal function. A pump shift, interlock circuit shall be provided to prevent the engine brake from activating during pumping operation.

ENGINE COOLING SYSTEM

The engine cooling system shall have the capacity to cool the engine according to the engine manufacture’s requirements.

RADIATOR

The engine radiator shall be of a bolted design and have a minimum core area of 1,570 square inches.

COOLING SYSTEM FAN

The engine cooling system shall incorporate a thermostatically controlled fan clutch. When the fan clutch is disengaged, the vehicle shall have improved vehicle performance, cab heating in cold climates, and fuel economy, while eliminating the potential dangers associated with a fan going from non-rotating to rotating as found with other style fan clutches. The fan shall automatically lock-up when the vehicle is placed in pumping mode. A shroud and recirculation shields system shall be used to ensure that once air has passed through the radiator, the same air is not drawn through again.

RADIATOR COOLANT, LONG LIFE

The coolant system shall contain a mixture to keep the coolant from freezing to a temperature of 34°F. The coolant supplied shall be Long Life Coolant compatible with the engine manufacturer's requirement.

COOLANT HOSES
The chassis shall be equipped with silicone hoses for the radiator and heater circuits.

COOLANT HOSE CLAMPS
Constant tension hose clamps shall be provided for all coolant and heater hoses of ¼" diameter and greater.

AUXILIARY ENGINE COOLER
The cooling system shall have a tube and bundle engine cooler mounted in the upper radiator water pipe. Water from the fire pump shall be circulated through ½" tubing to the cooler. A valve located on the pump panel shall control the cooling circuit.

FUEL TANK
The chassis shall be equipped with a minimum 50 gallon rear mounted fuel tank. The tank shall be constructed of 12 gauge steel with stainless steel mounting straps and rubber isolators secured to the bottom flange of the chassis frame rails. The tank shall be baffled to prevent sloshing, vented, and have a drain plug installed on the bottom. A 240-33 ohm fuel-sending unit shall be provided and broadcast across the SAE J1939 data link. The tank shall be certified to meet FMCSR 393.65 and 393.67.

FUEL LINES
The fuel lines shall be wire braid reinforced fuel grade hose. They shall have reusable fittings and be routed along the inside of the frame rails. Fuel lines shall be protected against chaffing by non-conductive, frame mounted standoff fasteners and, where necessary, with heavy-duty plastic zip loom.

FUEL SHUTOFF VALVE(S)
One fuel shutoff valve shall be installed in the suction side of the fuel lines near the fuel filters to prevent the loss of prime during fuel filter maintenance.

FUEL FILTER, SECONDARY
The Cummins engine shall be supplied with a secondary fuel filter mounted to the engine.

FUEL/WATER SEPARATOR, PRIMARY FILTER
The Cummins ISX engine shall be supplied with a Racor model 3150R primary fuel water separator with a bottom drain valve mounted in the chassis frame. The LMC will display "Water in Fuel", and an alarm will sound when the water needs to be drained from the fuel water separator.

EXHAUST SYSTEM
The apparatus shall contain a particulate filter and SCR (Selective Catalytic Reduction) device downstream of the engine's turbo. This filter and SCR device are required to maintain US 2010 EPA Emissions. This filter and SCR device replaces the conventional style filter. The location has been engineered, tested, and set to allow for proper regeneration. Therefore, this filter cannot be removed, altered, or relocated. An indicator light panel for this system shall be located in the cab informing the driver of the system’s status. At times a forced regeneration may be required, which would be indicated by a combination of illuminating and/or flashing lights depending on the engine model. A momentary switch labeled "Regen" shall be located within reach of the driver's seated position. The regeneration switch initiates the forced regeneration. A momentary DPF inhibit switch prevents the vehicle from having the ability to regenerate. Once the inhibit feature has been activated the ignition switch must be cycled off/on to return the vehicle to normal regen. All vehicles equipped with pumping applications shall allow for passive

regeneration whenever the system requires and the engine is at its proper parameters unless inhibited by the DPF inhibit switch. In no way shall this feature affect the RPM of the engine being controlled by the pump operator. The engine exhaust system shall be horizontal in design using stainless steel tubing mounted under the frame rail right side extending forward of the rear wheels. An exhaust temperature mitigation device shall be installed. The temperature mitigation device shall lower the temperature of the exhaust by combining ambient air with the exhaust gasses at the exhaust outlet.

ALTERNATOR

The alternator shall be a Delco Remy model 55SI 430 amp or equivalent. The alternator shall be engine driven via a poly-groove power belt with an automatic tensioner. The alternator shall be a brushless design. The alternator shall meet all current applicable NFPA 1901 Edition requirements for performance.

BATTERY SYSTEM

The battery system shall be properly sized consisting of Group 31, 12 volt DC, heavy-duty, high cycle automotive batteries. The battery bank shall have a minimum group rating of 3,750 cold cranking amperes (CCA) and a reserve of 1,080 minutes at 80°F. All battery wiring shall be welded 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°F. All cable connections shall be machine crimped and soldered.

BATTERY BOXES

The chassis batteries shall be mounted in welded and bolted stainless steel battery box. The battery hold-downs shall be made of structural, stainless steel angle. Painted carbon steel battery boxes shall not be acceptable.

BATTERY JUMPER STUDS

One set of battery jumper studs shall be provided on the chassis. 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. A tag shall be provided for positive/negative terminals. The battery jumper studs shall terminate at the driver's side battery box.

SWITCH, MASTER BATTERY DISCONNECT

The chassis batteries shall be wired in parallel to a single 12 volt electrical system, controlled through a heavy-duty, Guest brand or equivalent rotary type, master disconnect switch. The master disconnect switch shall be located within easy access of the driver upon entering or exiting the cab. All electrical circuits shall be disconnected when the switch is in the "Off" position.

TOTAL SYSTEM LOAD MANAGER W/HIGH IDLE

The apparatus shall be equipped with a Class 1 Total System Manager (TSM) for performing electrical load management. The TSM shall have two modes of operation, a "Calling Right of Way" and a "Blocking Right of Way". The "Blocking Right of Way" mode is activated only when the park brake is set. Load shedding shall "only" occur when the apparatus is in the "Blocking Right of Way" mode or when the battery voltage level reaches your programmed shed level. Outputs 1 through 12 shall be independently programmable to sequence on with the ignition or master warning switch. Outputs 1 through 12 shall also be programmable to be activated during the "Calling Right of Way" mode and or the "Blocking Right of Way" mode. Output 13 is user configurable output and is programmable for activating between 10.5 and 15 volts. Output 14 shall provide a low voltage warning for an isolated battery. Output 15 shall be designated to activate a fast idle system. Output 16 shall provide a low voltage alarm that

activates at the NFPA required 11.8 volts. The Total System Manager shall have an internal digital display to indicate systems voltage is in normal operation mode and indicates the output configuration during programmable mode. The Total System Manager shall be protected against reverse polarity and shorted outputs, and be enclosed in a metal enclosure to enhance EMR/RFI protection.

AIR COMPRESSOR/BATTERY CHARGER

A Kussmaul Pump Plus 1,200 or equivalent air compressor and battery charger package Model 091-9-12V-1200 shall be installed. The Auto Pump 12 volt driven air compressor shall ensure that the air brake system is properly pressurized for immediate response of the unit. A pressure switch shall regulate operation and shall automatically sense low air pressure in the brake system and restore the proper pressure. The unit shall have no interference with the vehicle mounted air compressor. The compact compressor shall have sealed bearings and a 15 amp circuit breaker installed in pressure switch assembly. The air compressor power mode selector switch shall select: 1) DC power full time from vehicle battery 2) AC powered only from the battery when vehicle is plugged into shore power and automatically shuts off air compressor when disconnected from shore power. The air compressor shall have the following ratings:

1) 100 PSI maximum rating
2) Pre-set at 75 PSI “ON” and 95 PSI “OFF”
3) Adjustable differential range of 20 PSI to 100 PSI
4) Output:
   0.30 SCFM @ 80 PSI
   0.35 SCFM @ 60 PSI
5) Rating: 12 volt at 11 amps

The battery charger shall be a Pump Plus 1200 Series 40 amp high output battery charger or equivalent shall be installed. The charger shall have the following operational specifications: 120 volts AC input at 10 amps and 12 volts DC output at 40 amps. The battery charger shall supply a ‘single battery bank’ with automatic operation and with an aluminum enclosure. The system shall have a built-in sense circuit to check battery voltage 120 times a second; the system shall compensate for voltage drop in charging wires and provide quick recharging with no over-charging. The unit shall include front panel connections for a remote display and auxiliary loads.

SUPER AUTO-EJECT, 20 AMP

There shall be provided one super auto-eject type receptacle(s) model 091-55-20. A solenoid wired to the vehicle starter is energized when the engine is started. This instantaneously drives the plug from the receptacle. The receptacle shall be provided with a weatherproof cover. The cover shall be spring loaded to close, preventing water from entering when the shoreline is not connected. The super auto eject receptacle shall be mounted in a location specified by the department and is designed to accept a 120V AC from a shoreline plug. The UL maximum allowable amperage draw on receptacles is generally 80% of their listed rating, for example, the 20 amp receptacle should not carry more than 16 amp continuous load. When adding the different amperage draws of the components being installed on the chassis, be sure to figure in whether the components shall draw a continuous load or intermittent load. This is to be located above driver's side Front Wheel. The Auto Eject cover(s) shall be a Kussmaul or equivalent, red in color.

SHORE POWER INLET PLATE

A shore-power "Inlet Plate" shall be permanently affixed at or near the power inlet. The plate shall indicate the following: type of line voltage, current rating in amps, and power inlet type (DC or AC).

STATUS CENTER

The Deluxe Auto Charge Status Center is a remotely mounted, digital voltage and amperes display, a five segment bar graph display to indicate output current, and four LEDs to show the condition of the batteries. The High and Low Battery Condition LEDs blink to indicate that there may be a problem with the vehicles electrical system. This indicator is an option for the Auto Charge 1200, the Auto Charge 1200 Remote, Pump Plus 1200 and others to come. There is a 3 ½ digit indicator that displays battery voltage with an accuracy of 30 millivolts, and a 3 digit indicator that displays charger current with an accuracy of 100 millivolts. The indicator is water tight and rugged. The unit is designed to be mounted on the outside of a vehicle to readily indicate the battery condition. Bezel color will be red. The indicator comes with a three year warranty. The location of the unit is TBD.

CUSTOM CAB

The cab shall be an engine forward extended, medium four-door, (raised roof, notched) full tilt cab. The cab shall be an "Open Interior" roll cage design requiring no inner walls or vertical interior supports. The cabs roof shall be raised, providing additional headroom above the crew area. The raised portion shall start midway over the driver and officer seats. The cab's seating capacity for emergency personnel shall be five. A 48" wide notch shall be provided in the cabs roof for nesting of an aerial device without increasing the overall height of the apparatus. All storage areas inside the cab shall fully comply with NFPA 1901 restraint requirements of 9 Gs.

CRASH TEST

The cab shall exceed the strict and detailed requirements of the Economic Commission for Europe Structural Standard, ECE-29R. The test shall consist of an impact load test and a vertical load test to the cab. The cab shall have a frontal impact tests via pendulum, with an impact load in excess of 127% of the ECE-29R Standard. The estimated speed of the 3,736 pounds (1,698 kilograms) pendulum shall be a minimum of 18.2 MPH. The cab doors shall be closed during the impact test but be able to open after impact. There shall be no passenger intrusions or any structural component failures. The cab shall meet or exceed all criteria of this portion of the test. In conjunction with the frontal impact test, a vertical load test shall be implemented to the cab. The cab roof shall be loaded with a minimum of 65,979 pounds (29.53 metric tons). There shall be no failure to the cab structure or mountings, any passenger compartment intrusion or degradation of occupant survival space, or any other structural failure. The cab shall meet or exceed all criteria of this portion of the test. A complete photographic, video, data, and dimensional record of these tests shall be available and placed on record for customer evaluations.

CAB MATERIALS

The vehicle shall be designed by an all-welded aluminum and fully enclosed tilt cab. The cab shall be designed exclusively for fire/rescue service and shall be pre-engineered to ensure long life. It shall incorporate an integral welded substructure that is aesthetically appealing, functionally durable, and characterized by increased personnel safety. The cab shall be minimally constructed entirely of aluminum alloy extrusions 3/16" thick, 5052-H32 alloy, marine grade aluminum sheets. The corner posts, door slam posts, roof rails and doorframes shall be made of custom extrusions designed specifically for this cab with slots for inserting the skin. The rear wall and roof shall be reinforced with a grid of rectangular extrusions, which are welded to the overall cab extrusion framework. The front corner caps shall consist of castings designed specifically for this cab with relief areas cast in place for attachment of roof skin and intersecting structural extrusions. Overlapping formed corner caps are not acceptable.

CAB DIMENSIONS

- Overall width skin to skin: 96” minimum
- Overall vehicle width: 120 inches maximum (w/standard mirrors)
- Overall length: 136 inches minimum
- Cab Height Rear: 95” maximum
- Windshield area: 3,300 square inches minimum
- Cab full tilt angle: 45°
- Floor to ceiling in front: 60” minimum
- Floor to ceiling in outer rear: 66” minimum
- Floor to ceiling in inner rear: 58” minimum
- Engine cover height: not to exceed 27 ½” in the front and 33 ½" at the rear
- The Driver shall have no less than 24 ¼" of hip room
- The Officer shall have no less than 23 ¼" of hip room and 21 ¾" with ISX15 engine

DOUBLE WALL CAB FACE

The cab front shall be minimally constructed of double wall construction resulting in a sealed firewall. The inner and outer shall both be formed from 3/16" thick, 5052 H32 alloy aluminum with structural aluminum reinforcements. This design provides for increased structural integrity, crew safety, and reduced road noise in the passenger area. The outer wall is used for mounting forward lighting, grill and windshield wipers. The inner portion shall be treated with a heavy black undercoating material for corrosion prevention.

SEALED ENGINE TUNNEL

The engine tunnel shall be a structural part of the passenger cab, constructed from welded 3/16" aluminum plate and reinforced with aluminum extrusions. The rear of the engine tunnel shall be no less than 57” from the rear wall of the cab, allowing maximum legroom for forward facing passenger. After welding, the seams shall be completely sealed with silicone caulking. Engine enclosures that are not an integral part of the cab structure are not acceptable. The interior of the engine tunnel shall be insulated with 1” thick foil backed insulating foam, attached with stud and button method. A cross-section analysis of the insulation shall reveal a 1/8” thick barrier material for additional noise and heat insulation.

CAB FLOORS

Cab floors shall be constructed minimally from an aluminum extruded frame and 3/16" thick aluminum plate. Floor mats and insulation are detailed later in this specification. The forward cab floor shall be as large as possible for both the driver and officer. Floorboards shall extend in width from the side of the engine tunnel, all the way to the cab door inner panel. They shall extend forward from the seat riser to the inner portion of the double wall cab face. The officer shall have approximately 28” of foot room. The entire rear floor of the cab, to reduce trip and fall hazards, shall be a single plane. In applications requiring the use of a top-mounted PTO, a raised area in the floor may be required. For maximum crew comfort and eliminate leg fatigue during emergency responses, the floor beneath the rear facing jump seats shall be large enough for a seated firefighter to rest both feet side-by-side. Cab floor designs that are wide enough for only one foot shall not be accepted.

CAB CORROSION PROTECTION

A corrosion preventative material shall be applied during cab construction. A ten year warranty against corrosion perforation shall be provided for the cab.

WHEEL WELL LINERS
Full wheel well liners shall be installed beneath the cab to protect the bottom of the cab from road splash. The liners shall be constructed of aluminum and be full width. The wheel well liners shall be attached with threaded fasteners and be easily removable for service.

FENDERETTES
Ruggedized black fenderettes shall be installed at the wheel well openings. A rubber gasket shall be installed between the fenderette and cab to eliminate contact of dissimilar metals.

WINDSHIELD
The windshield shall be provided with tinted automotive safety glass, with a wraparound design. A .03" thick vinyl layer shall separate the laminated glass. All other cab glass shall be tinted and tempered.

INTERMITTENT WINDSHIELD WIPERS
Electric "Pantograph" style windshield wipers shall be installed on the front face of the cab. The motors shall operate through a 72° sweep and include 24" blades to give superior wiper coverage. A washer reservoir of not less than 70 ounces shall be mounted a latched door recessed in the officer's step. A switch located on the turn signal control arm shall operate the intermittent wipers.

EXTERIOR GRAB HANDLES
Stainless steel handrails with a knurled, slip-resistant finish shall be positioned behind each cab door. Grab rails shall be a minimum of 24" in length. Molded rubber gasket shall be mounted between the grab handles and the cab in order to prevent corrosion due to dissimilar metals being in contract. Handrails shall be coated in a black, ruggedized finish.

EXTREME DUTY CAB INTERIOR
Cab floors shall be covered with a pebble grain rubber matting with barrier type insulation. Edges of the insulation shall be trimmed with a cast aluminum foot plate for a pleasing appearance. An insulated covering shall be fitted over the engine tunnel. Made from the same material as the cab floor insulation, this covering shall insulate the cab from engine heat and noise. A Cast Products aluminum door on the rear of the engine tunnel shall provide access for fluid checks. The back side of the engine cover, as well as, a 2" to 3" return on the top side, shall be covered with a sprayed aluminum panel and be of sufficient strength to allow for 9G resistant mounting of any optional hand lights, entry tools, or other fire rescue equipment specified by the customer. The cab shall have a custom built, smooth aluminum plate dashboard, overhead console, glove box, instrumentation panel and switch panel. The front overhead shall include room for the three sun visors and the door open indicator light. The front door posts shall be trimmed with styled aluminum covers that conceal any wiring, as well as, including a mounting area for rubberized grab handles. The center windshield post shall be covered with a ruggedized paint finish. Prior to installing the headliner and rear wall padding, minimum R-7 insulation, shall be installed between the interlocking extrusions. These covers serve to finish the interior, cover wiring harnesses and insulate the interior from sound and heat.

CAB STEPS
All cab steps shall be of a stationary, fixed design that use no moving parts and requires no periodic maintenance other than cleaning. There shall be an open-grip step at each cab door opening. The area under the step shall be enclosed to prevent road dirt from entering the cab. There shall be provisions made at the front of the step for easily flushing out any dirt accumulation. At each door, opening there shall also be an intermediate cab step. Intermediate

steps shall be full width of the doorstep area and constructed from embossed aluminum tread plate. Steps and assemblies shall be coated in a black, ruggedized protective finish.

CAB STEP HEIGHTS

The distance from level ground to the first cab step shall be 19" to 21" without using swing-down style or under-cab "stirrup" auxiliary steps. The distance from first cab step to intermediate step shall be approximately 12.5" front and rear. The distance from intermediate step to cab floor shall be approximately 9.5" inches in the front and 12" in the rear.

UREA STORAGE TANK

There shall be a five gallon urea tank located under the extended portion on the cab. A urea level gauge shall be provided in the cab on the main instrument panel. There shall be a DEF fuel fill assembly mounted in the left crew cab extension. The fill assembly shall have cast aluminum door and fuel fill cap with retention ring. The assembly shall be properly labeled "Diesel Exhaust Fluid Only". The DEF door shall be painted with a black ruggedized material.

CAB DOORS

All cab doors shall be full length, designed to cover the step well area. Each cab door shall be flush type with a minimum opening of 85°. The doors shall include a bulb style rubber seal around the perimeter of each door frame ensuring a weather tight fit. The cab entry doors shall be equipped with exterior pull handles, suitable for use while wearing firefighter gloves. The handles shall be made of aluminum with a black ruggedized finish. The interior latch shall be cast aluminum, oversized for easy access with a gloved hand.

DOOR HINGES

Each cab door shall be attached to the cab with two concealed automotive style hinges with restraining strap.

CAB DOOR LOCKS

The door locks shall be electric over manual with individual master controls at each door. Each rocker switch shall control all locks on all cab doors. There shall be individual twist type door locks at each door handle. In accordance with FMVSS 206, all exterior door locks shall be keyed alike.

DOOR ENTRY KEY PAD

One keyless entry system with keypad and two wireless fobs shall be provided. The keyless pad shall be backlit for nighttime convenience, with multiple user codes. The system shall have a multiple incorrect entry alarm feature that flashes the interior dome light with a 30 second lock out. The key pad shall be installed on the driver's door both the pad and wireless fobs shall operate the electric door locks.

CAB DOOR WINDOWS, ELECTRIC

All cab door windows shall be electrically operated. The driver's door shall contain four switches to control the operation at each door. All remaining doors shall contain one heavy-duty switch to control the window operation located on top of the door panel.

EXTERIOR EMS COMPARTMENT ACCESS, LEFT SIDE

One rollup door for access to the interior EMS compartment shall be installed. The door shall be painted job color and include a locking mechanism. Opening of this door shall activate the interior lighting of the EMS compartment.

FIXED CAB WINDOW, RIGHT SIDE
A window of not less than 16½" wide x 33½" high shall be installed in the right sidewall of the cab between the front and rear door. The glass shall be tempered, dark tinted and retained with one piece triple locking rubber lacing.

CAB TILT LOCK
The cab shall be supported at four points. At the front, there shall be two center bonded bronze bushings. At the rear, there shall be two hydraulic locking latches. The cab shall tilt 45° by means of a pair of hydraulic cylinders driven by the electric pump. The tilt system geometry shall be designed in such a way that the maximum hydraulic pressure in the system does not exceed one-half the pressure rating of the cylinders or pump when the cab is empty. This allows the Fire Department to leave some equipment in the cab when maintenance is required (although this equipment must be secured). Once the cab is fully tilted, a safety latch shall automatically engage and act as a positive lock. The lock is released by a pull cable. The hydraulic cylinders shall be equipped with velocity fuses to prevent the cab from falling, should the hydraulic system fail. The front of the cab pivots and rides on the center bonded bushings by means of lubricated pivot pins that retain the cab yoke in the bushings. The bushings allow limited movement of the cab, and isolate the cab from noise and vibration. The rear mounts consist of a pair of hydraulic cab latches mounted on rubber cushioned mounting brackets. Latches release when the pressure in the tilt system exceeds 500 PSI. An ignition interlock system shall be installed for cab tilt operation. Cab tilt operation requires the master battery switch to be in the on position with the parking brake applied.

CAB TILT PUMP W/MANUAL BACKUP
An electric over hydraulic cab lifting pump shall be provided to tilt the cab for engine and transmission service. The pump shall be operated by a remotely wired control box with coiled cord, weather resistant plug, and receptacle. An interlock shall be provided preventing the cab from inadvertently rising until the transmission is placed in the neutral position and the parking brake is set. In the event of electrical failure, a hydraulic manual backup shall be provided to tilt the cab.

FRONT CIRCULATION FANS
Two 6" circulation fans shall be mounted on the front overhead console, one for driver and one for officer side of the vehicle.

HEATING/AIR CONDITIONING SYSTEM
The climate control system shall use appropriately-sized heater-air conditioner units. The units shall blow up toward the windshield through adjustable vents in the dash. Additionally, there shall be two adjustable vents each side to direct air at the lower portion of the driver and officer seating areas. Two switches, including low/med/high and heat/off/ ac, shall control the front system. A blend air switch shall be installed to operate both the front heating and cooling systems. This provides hot and dry air for defogging purposes. Switches including high/med/low and heat/off/AC shall control the units. In addition to the rear control switches, there shall be an On/Off switch located near the driver to disable the rear unit if needed. The entire roof and back wall shall be heavily insulated with 1" foam to enhance the cooling system. Heaters shall be plumbed with a shut off valve at the engine. The roof top condenser housing(s) shall be red in color.

SEAT COLOR
The cab seats shall be gray in color.

DRIVER'S SEAT
The driver's seat shall be an Emergency 911 Seating Model 911 XL Highback with air ride suspension. The seat shall have powered ten-way adjustability with multiple user memory by the driver in accordance with SAE J1517. The seat shall be equipped with an integrated three point seat belt with an automatic retractor. The belt shall be red in color to meet current NFPA requirements.

OFFICER'S SEAT
One Emergency 911 Seating Model 911 XL SCBA shall be installed. Seat features shall include six way electric and ready reach feature. There shall be a SmartDock Gen II hands-free SCBA holder provided with the seat. The SCBA holder shall be a strap-free docking station with single motion insertion and hands-free release when the occupant rises out of the seat. There shall one SCBA seat cavity removable panel provided for a smooth back when the breathing air apparatus is not in use.

COMPARTMENT, DRIVER'S SIDE OUTBOARD REAR FACING
One full height EMS compartment constructed of 1/8" smooth aluminum shall be mounted in the cab. This cabinet shall be installed rear facing behind the driver's seat. The cabinet shall be supplied with a sprayed finish to match the interior of the cab.

EMS COMPARTMENT COVER, INTERIOR
An NFPA compliant cover will be attached to secure the contents of the compartment. Cargo netting consisting of multiple seat belt style buckles will not be acceptable.

LIGHT(S), EMS COMPARTMENT
There shall be one 36" OnScene Solutions Access model 73036 shall be installed in the driver's side EMS compartment. The light shall provide 15HB of surface mounted LEDs per 10" sections and produce a minimum of 200 lumens per 10" of length. A switch to activate this light shall be located on the exterior wall of the compartment, easily accessible by the rear crew member. Additionally, this light shall illuminate when the exterior rollup door is opened.

SHELVES, EMS COMPARTMENT
There shall be two vertically adjustable shelves installed in the driver's side EMS cabinet. The shelf shall be constructed of smooth aluminum and have a 2" lip at the front, sides and rear of the shelf.

120V SHORE POWER RECEPTACLE, EMS COMPARTMENT
There shall be one 120V duplex receptacle installed in the driver's side EMS compartment. The outlet shall be a household type with straight blade plugs. The outlet shall be located in the lower left corner of the cabinet. This outlet shall be powered by the shore line and will be labeled as such.

12V POWER OUTLETS, EMS COMPARTMENT
There shall be two 12 volt power outlets installed in the driver's side EMS compartment.

CREW SEAT, OFFICER'S SIDE REAR FACING
One outboard, rear facing, seat shall be installed behind the officer. The seat shall be an Emergency 911 Seating 911 XL SCBA non-suspension seat. The seat shall include the ready reach system. There shall be a SmartDock Gen II hands-free SCBA holder provided with the seat. The SCBA holder shall be a strap-free docking station with single motion insertion and hands-free release when the occupant rises out of the seat.

CREW SEATS, INBOARD FORWARD FACING
Two inboard, forward-facing seats shall be installed against the rear cab wall. The seats shall be an Emergency 911 Seating 911 XL SCBA non-suspension seat. The seats shall include the ready reach system. These seats shall be spaced apart as far as possible to allow for crew member comfort and maneuverability. There shall be a SmartDock Gen II hands-free SCBA holder provided with the seats. The SCBA holder shall be a strap-free docking station with single motion insertion and hands-free release when the occupant rises out of the seat.

CUSTOM FRONT GRILLE
The front grille shall be covered in a black, ruggedized coating.

INTAKE GRILLE, RIGHT SIDE W/EMBER SEPARATOR
A right stainless steel grille shall be installed. This grille shall be covered in a black, ruggedized material.

HEATED/REMOTE CAB MIRRORS
Two side mounted rear view mirrors shall be installed with a 14.5" x 7" mirror head and a separate 6" x 8" parabolic mirror. The mirror head shall be heated and remotely adjustable by the driver. The mirrors shall be aerodynamically designed to reduce wind buffeting and resultant vibration. The housings shall be finished in a black ruggedized material. The mirrors support tubes shall be 7/8" stainless steel, with breakaway mounting brackets.

EXTERIOR TRIM, REAR CAB STEP WELL
The rear cab door stepping surfaces shall be trimmed with aluminum tread plate. There shall be tread plate covers that provide access to the chassis battery system. This tread plate shall be painted with a black ruggedized material.

ADDITIONAL CAB INSULATION SPRAY
In additional to the standard insulation package the complete under cab, inside the cab ceiling and back wall (before standard insulation in installed), engine tunnel and floor shall be coated with VL-37 spray.

UNDER CAB INSULATION
The underside of the cab tunnel surrounding the engine and the underside of the entire cab floor shall be lined with multi-layer insulation, engineered for application inside diesel engine compartments. The insulation shall act as a noise barrier, absorbing noise thus keeping the decibel level in the cab well within NFPA recommendations. As an additional benefit, the insulation shall assist in sustaining the desired temperature within the cab interior.

CAB CORROSION PROTECTION AND SOUND DEADENING
The apparatus cab shall be completely covered in one of two types of paint, prior to installation of any interior or exterior components, including insulation and floor mats. This process shall be required to guard against corrosion as well as to keep the cab as quiet as possible for firefighters. The entire underside and double wall area at the front of the cab shall be cleaned, primed and sprayed with black ruggedized material as a finish coat. This shall include any areas that are not normally visible after the cab is complete. The entire cab interior shall be sprayed with a ruggedized material, as described later in these specifications. The cab exterior shall be completely finish painted with DuPont or equivalent paint, as described later in these specifications. This shall include the areas under any optional rear wall or cab roof diamond plate overlays. The fire department shall, through the Virtual Manufacturing feature described earlier in these specifications, have the ability to see these areas covered with the ruggedized coating prior to installation of items such as engine tunnel insulation, cab interior insulation and

headliners, engine tunnel covering, floor mats, cab inner door panels, etc. As a result of these cab corrosion protection measures, a ten year warranty against cab corrosion shall be provided to the fire department.

INTERIOR CAB FINISH
The interior of the cab shall be painted with a black ruggedized material. The cab metal finish shall be covered with a coat of adhesion promoting primer. The front and rear headliners, as well as, rear wall (if applicable) shall be covered with heavy-duty black vinyl.

FLOOR MATS/ENGINE TUNNEL COVERING
The floor mats and engine tunnel shall be covered with black pebble grain vinyl with ¼" foam backing. The edges of the floor mats shall be trimmed with a cast aluminum foot plate for a pleasing appearance.

INTERIOR TRIM, REAR WALL ALUMINUM PANEL
The entire interior rear wall of the cab shall be covered with a Pack Trac mounting system.

CAB GRAB HANDLES, INTERIOR
Two interior grab handles installed in the cab on the "A" posts with one on each side. The grab handles shall be constructed of rubberized steel. Four interior grab handles shall be installed in the cab, one each side on top of the front door panels adjacent to fixed window and one each side on the rear door panels. The grab handles shall be constructed of 1¼" knurled stainless steel. The grab rails shall be mounted with chrome plated end stanchions. There shall be one interior grab handle installed on the inside of each rear cab door. The handles shall extend horizontally with width of the window just above the window sill. The grab handles shall be constructed of bright stainless steel.

GLOVE BOX
The glove box shall be an integral part of the welded aluminum dashboard assembly and located on the officer side of the cab. The storage area of the glove box shall bolt in place for easy service access. The door shall be drop down style and constructed from brushed stainless steel with a recessed latch. The area above the glove box shall be flat for a work surface or optional MDT mounting.

SUN VISORS
The cab shall be equipped with three sun visors. The visors shall be installed on the overhead panel and provide approximately 90% coverage across the width of the cab. The visors shall be approximately 26" wide and 6" tall.

UPPER DOOR PANELS, INTERIOR
There shall be four interior upper front and rear door panels installed covered with a ruggedized material extending from the window down to the lower kick plate. The color of the panels shall match the interior of the cab unless otherwise specified.

LOWER DOOR PANELS, INTERIOR
There shall be four interior lower front and rear door panels installed covered with a ruggedized material extending from the window down to the lower kick plate. The color of the panels shall match the interior of the cab unless otherwise specified.

INTERIOR DOOR REFLECTIVE STOP SIGNS
Large reflective stop signs, covering a minimum of 96 square inches shall be located within the lower door panel.

EQUIPMENT MOUNTING PLATE, ENGINE TUNNEL
There shall be one equipment mounting plate installed on the engine tunnel with 45° bends on the driver and officer sides constructed of 3/16" smooth aluminum plate covered with a ruggedized material.

EQUIPMENT MOUNTING PLATE, RAISED ENGINE TUNNEL PORTION
There shall be one equipment mounting plate installed on the raised portion of the engine tunnel constructed of 3/16" smooth aluminum plate covered with a ruggedized material.

ENGINE TUNNEL REINFORCEMENT, EXPANDED ALUMINUM
The engine tunnel insulation shall be covered and reinforced with expanded aluminum. The expanded aluminum overlay shall assist in retaining the insulation tight against the cab.

PAC-TRAC TOOL BOARDS
The following Pac-Trac tool boards shall be installed in the cab for the mounting of additional equipment along the entire rear wall, side of EMS compartment, and compartments TBD at pre-construction. The tool board slats shall be provided with Trac Lock inserts and fasteners.

INSTRUMENTATION
For easy viewing, gauges shall be white faced with black lettering and adjustable intensity LED backlighting. The gauges shall meet SAE J-1939 protocol to eliminate redundant sending units. Gauges must be fully sealed to 6 PSI. The gauge crystal shall be polycarbonate, anti-fog, and anti-scratch coated. The panels shall be divided into groups of instruments that make identification sensible and easy to view. The following instruments shall be included in the gauge panel in front of the driver:

- Dial Type voltmeter gauge
- Dial Type coolant temperature gauge with warning light
- Dial Type engine oil pressure gauge with warning light
- Engine hour/trip hour red reset button
- Dial Type tachometer with digital engine hour meter and trip hour meter along with a digital, fourline diagnostic display
- Driver information display panel with alarm output for gauge warning lights
- Dial type primary air pressure gauge with warning light
- Panel light dimmer control knob
- Dial type secondary air pressure gauge with warning light
- Dial type fuel level gauge with low fuel indicator level
- Dial type Diesel Exhaust Fluid gauge with low level indicator
- Dial type transmission temperature gauge with warning light
- Odometer/trip odometer red reset button
- Dial type speedometer gauge with digital odometer and trip odometer that is active when pumping

The following indicator lights shall be provided in the gauge panel:

- Air cleaner restriction light
- High beam indicator
- Parking brake indicator
- Turn signal indicators
- Low primary air
- Low secondary air
- Battery voltage error
- Door ajar
- Auto chassis lubrication system (if equipped)

- Emergency engine shutdown (if equipped)
- Diagnostic indicators for airbag, engine, transmission, and ABS

The lower dash to the left of the steering column shall contain the ignition, start and headlight switches. When a multiplexed electrical system is used with a display screen the headlight switch will be located in this screen. The lower dash to the right of the steering column shall contain the regeneration and traction control switches. The electronic diagnostic connections for the engine, transmission, and ABS brakes shall be located in the lower left firewall.

SERVICE ACCESS

The driver's instrumentation area shall be made of textured black non-glare panels affixed to the aluminum dash. There shall be a single gauge panel, secured with a bottom hinge and four quarter-turn fasteners. Access to the gauge clusters shall be accomplished simply by releasing the latches and pulling the panel outward. Other gauge access designs are not acceptable. The chassis electrical panel shall be located in the center of the aluminum dash, between the switch panel and the windshield. There shall be a lift up cover, with two recessed lift-and-turn latches for quick access to the panel. The underside of the panel shall have a pre-printed diagram that clearly depicts the function of each circuit breaker and relay. The vehicle load manager shall be located in this panel. The opening to the electrical shall measure approximately 19" wide near the switch panel and 37" wide toward the windshield.

DRIVER'S INFORMATION DISPLAY

There shall be a display panel on the driver's gauge cluster that will illuminate various caution and warning indicator lamps. This display also contains a 340 x 90 monochrome LCD for display of specific and user selectable data. The display unit reads data from the J1939-11 power train communications network. Display will be capable of but not limited to the following features:

- Auto SelfTest
- Viewing the state of each digital or analog input to the unit
- Viewing the state of each output
- Allows users ability to set service reminders by distance or hours of operation
- Allows users ability to set data screens in various formats i.e. bar graph / text
- Viewable active and stored powertrain ECU fault data.
- Diagnostics screen allows user to select and view a specific source such as engine / transmission
- Display is selectable between English and metric readings.
- Messages and Icons will pop up in display when a condition exists such as: transmission oil life, filter or other service needed as reported by the Allison Transmission ECU engine conditions: low oil pressure, high coolant temperature, low coolant level, water in fuel, check / stop engine, regeneration needed, high exhaust temperature. Indicator lights may also accompany pop up messages: Door ajar indicator will also pop up a "DO NOT MOVE VEHICLE, CHECK ALL DOORS AND ITEMS THAT RAISE OR EXTEND BEYOND APPARATUS CAB OR BODY" message

CHASSIS ELECTRICAL SYSTEM

The chassis shall be equipped with a Weldon V-Mux multiplexed electrical system. The multiplex system shall consist of all solid-state components contained inside sealed aluminum extrusions and/or weatherproof Deutsch enclosures referred to as nodes. Each extruded node shall consist of 24 output channels and 19 input channels. Each extruded node is to have a set of diagnostic LED indicators. The system shall also incorporate, as needed, miniature nodes. The mini nodes shall have 12 digital outputs and 5 inputs. Each mini node must have a set of diagnostic multiple switch signals to be available to the electronics system. All inputs and

outputs shall be configured into a scalable electrical harness utilizing Deutsch connectors. The nodes shall not have special mounting requirements. The system, at a minimum, shall be capable of performing the following functions: load management and sequencing, switch loads, receive digital and analog signals, perform and report diagnostics, continuously report vehicle status, and system is expandable. Placement of nodes within the cab of the chassis enables a reduction in wire harness bundles, elimination of redundant harnessing and separate circuit boards, relay and circuit breakers, electrical hardware, separate electrical or interlock subsystems and associated electronics for controlling various electrical loads and inputs. The multiplex system shall be field reprogrammed and re-configurable by an authorized service center. This complete system shall eliminates the need for the following separate components or devices: load manager, load sequencer, warning lamp flasher, headlamp flasher, door open notification system, interlock modules, separate volt meter, ammeter and temperature monitor. The base system includes: total load management, load shedding capabilities, load sequencing capabilities, on board diagnostics readout, very reliable, solid state hardware, error reporting, continuous system monitoring and reporting, emergency warning lamp flasher, field configurable, expandability capabilities, and advanced pc diagnostics. As programmed electrical system reports shall be generated by the multiplex system designer software and furnished in the apparatus manuals. A master circuit list of electrical circuits that the apparatus builder installs shall be furnished in the delivery manuals.

MAIN CENTER DASH

The main center dash area shall include three removable panels located as follows: one to the right of the driver position, one in the center of the dash, and one to the left of the officer position. The center panel shall be within comfortable reach of both the driver and officer. The panel shall be constructed of 5052-H32 Marine Grade, 1/8” thick aluminum plate.

SWITCH PANEL, DRIVER'S SIDE

The driver's side panel shall be constructed of 5052-H32 Marine Grade, 1/8” thick aluminum plate. The dash panel shall include the following: transmission shifter and pump shift control. The remaining panel shall house a full color graphical Weldon Vista IV display that offers many enhanced features for display, control, and diagnostics of the multiplex system. The Vista IV incorporates seven switches with custom legends and has a wide temperature operating range. The Vista IV shall control most all required switches including automatic climate control for front air conditioner equipped chassis. The climate control panel shall also include switching to enable or disable the rear under seat air conditioner/heater unit if so equipped. Features shall include: Operates in 12 or 24 volt applications, virtual switches, color display, virtual gauges, rear view camera (if applicable), visual door indicator, automatic climate control, reprogrammable by OEM, peer to peer network, onboard diagnostics, onboard service information, displays inside/outside temperature, and video ready for: backup camera, thermal cameras, DVD and GPS.

SWITCH PANEL, CENTER

The center panel shall be constructed of 5052-H32 Marine Grade 1/8” thick aluminum plate. The dash panel shall include the following: the left side of the panel shall house the Mirror Control (joystick type) and parking brake control in the lower portion, the mirror heat switch shall be located in the display screen, and the remainder of the panel shall house the electronic siren control head, Firecom system, and fire radio.

SWITCH PANEL, OFFICER'S SIDE

The officer's side panel shall be constructed of 5052-H32 Marine Grade 1/8” thick aluminum plate. The dash panel shall include Vista IV display.

VEHICLE DATA RECORDER
The chassis shall have a Weldon Vehicle Data Recorder (VDR) system installed. The system shall be designed to meet NFPA 1901. The following information shall be recorded: vehicle speed, acceleration, deceleration, engine speed, engine throttle position, abs event, seat occupied status, seat belt status, master optical warning device switch position, time, and date. Each portion of the data shall be recorded at the specified intervals and stored for the specified length of time to meet NFPA 1901 guidelines and shall be retrievable by connecting a laptop computer to the VDR system.

SEAT BELT WARNING SYSTEM
A Weldon seat belt warning system, integrated with the Vehicle Data Recorder system, shall be installed for each seat within the cab. The system shall provide visual warning indicator in the cab, and indicator light in the instrument panel, and an audible alarm. The warning system shall activate when any seat is occupied with a minimum of 60 pounds, the corresponding seat belt remains unfastened, and the park brake is released. The warning system shall also activate when any seat is occupied, the corresponding seat belt was fastened in an incorrect sequence, and the park brake is released. Once activated, the visual indicators and audible alarm shall remain active until all occupied seats have the seat belts fastened.

STEERING COLUMN AND SMART WHEEL
The steering column shall be a Douglas Autotec tilt and telescope. A lever mounted on the side of the column shall control the tilt and telescope features. A Signal-Stat (self-canceling) turn signal switch shall be mounted to the column. The steering shaft from the column to the meter box shall have a rubber boot to cover the shaft slip and a second rubber boot to seal the passage hole in the floor. Spacing between this rubber boot and the brake pedal shall be large enough as to allow for ample spacing between column, brake, and accelerator pedals. The steering wheel shall be 18” in diameter and include the programmable Smart Wheel feature. Smart Wheel controls shall control the following: air horns, Nathan Train Horns, and Mechanical Q-siren. The Signal-Stat turn signal switch shall include the following functions: left and right turn signals, high beam dimmer control, hazard warning switch, two speeds with intermittent windshield wiper control, and windshield washer control.

SWITCH, MANUAL FAST IDLE
There shall be a manual fast idle switch mounted on the dash. When activated, the switch shall increase the engine idle speed to approximately 1,200 RPM to allow the alternator to supply additional charging of the apparatus battery system. The fast idle switch shall only operate if all interlocks are met. Apparatus transmission must be in neutral with the parking brake set and the fire pump (if equipped) must not be engaged.

12-VOLT FUSE BLOCK
There shall be one Blue Sea fuse block 5025 installed in a location determined by the customer. The unit shall include six 12 volt constant power supply ports and grounding buss with easily changeable fuses. The unit shall have a 100 amp total operating range. The location shall be the top shelf of EMS compartment.

CHARGING PORTS, 12-VOLT USB
There shall be three 12 volt USB charging ports provided in the cab. The location is TBD.

CUSTOM CONSOLE
A custom console shall be fabricated and installed on the engine tunnel. The console shall have a map book storage area with a hinged lid. The front of the console shall be equipped with a center

storage slot for medical gloves and a cup holder on each side. The console shall be constructed of smooth aluminum painted with a rugged material to match the interior of the cab.

RADIO

A Jensen radio with weather band, AM/FM stereo receiver and rear iPod input pigtail connector, satellite radio capability, a front panel mini stereo input jack, and four speakers shall be installed in the cab. The radio shall be installed in the driver's side overhead position. The speakers shall be installed inside the cab with two speakers recessed within the headliner of the front of the cab just behind the windshield and two speakers on the upper rear wall of the cab. Deactivate radio when in the response mode, unless parking brake is engaged. A small antenna shall be located on the left hand side of the cab roof for AM/FM and weather band reception.

RADIO POWER CIRCUIT

A 50 amp switched battery power circuit with manual reset shall be installed behind the officer's seat to activate the radio.

POWER AND GROUND STUDS

The electrical distribution panel shall include two power studs. The studs shall be size 10 and each of the power studs shall be circuit protected with a fuse of the specified amperage. One power stud shall be capable of carrying up to a 40 amp battery direct load and one power stud shall be capable of carrying up to a 20 amp ignition switched load. The two power studs shall share one size 10 ground stud.

12 VOLT POWER OUTLETS

There shall be four 12 volt power outlets provided in the cab. The power outlets shall be wired to direct battery power with the appropriate wire size and fuse. The locations are TBD.

ELECTRONIC SIREN

There shall be one Whelen or equivalent siren control head mounted in the cab. It shall incorporate a 12V/200W remote siren amplifier on an aluminum alloy chassis covered by an aluminum alloy housing with a powder coated black top for maximum protection. The control shall be furnished with a flush mount black polycarbonate powder coated control head. It shall have the ability for either 100 or 200 watt output. The front overlay of the control head shall be made of a black polycarbonate and powder coated. The lettering and artwork on the overlay shall be illuminated with adjustable backlighting of soft LED non-glaring green. The control head operating controls will consist of a power switch, manual button, and a function rotary switch. The control head shall include a 20A/32V fuse. The microphone shall be hardwired to the 295HFS2. The 295HFS2 PC board shall have input polarity protection, output short circuit protection. The solid state siren speaker amplifier shall be vibration resistant. The 295HFS2 shall have four Scan-Lock™ siren tones with two manual functions for additional siren tones. The siren amplifier shall have the ability to customize the placement of each siren tone with the rotary switch. The siren amplifier shall have a "Siren in Use" icon driver and adjustable preset repeat radio volume. The PTT (push to talk) switch on the microphone shall override all siren functions. The 295HFS2 shall have a combination On/Off and horn ring transfer switch with Bi-polarity horn/ring activation control. The 295HFS2 shall have SI Test® capability to perform a complete diagnostic silent test of amplifier and speaker(s). The siren amplifier shall have a quick disconnect plug. The 295HFS2 shall have the ability to activate siren tones with "Aux Enable" input either with a slide switch, power controls, or relay-to-ground connector. The 295HFS2 shall meet Class A requirement for SAE, AMECA, KKK1822, and California Title XII. The sire amplifier shall include stainless steel hardware for installation. The 295HFS2 is covered by a five year factory warranty. Siren shall also include the Whelen Powercall siren tone. The location is TBD.

HORN, ELECTRIC
A single electric horn activated by the steering wheel horn button shall be provided.

BACK-UP ALARM
There shall be one Whelen model WBUA107, 107 dB, electronic back-up alarm installed at the rear of the apparatus. The alarm shall be wired to the transmissions output signal and is automatically activated when the transmission is shifted into reverse.

LIGHTS, CAB DOME
Four Whelen 6" Round Super-LED model 60CREGCS shall be provided in the cabs headliner. The steady burn 12V interior light shall incorporate six red and six clear Super-LEDs and a clear non-optic translucent hard coated polycarbonate lens for maximum output. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The conformal coated PC board and foam in place gasket shall provide additional protection against environmental elements. The 60CREGCS includes Hi/Low intensity mode standards and On/Off dual switch function. The solid state interior light shall be vibration resistant. The interior light is covered by a five year factory warranty. The white LED lights shall be activated when any cab door is in the open position automatically switching off all red lights currently on and reactivated when the door is closed.

LIGHTS, ADDITIONAL CAB DOME
There shall be two additional Whelen 6" Round Super LEDs model 60CREGCS shall be provided in the cabs headliner. The steady burn 12 volt interior light shall incorporate six red and six clear Super-LEDs and a clear non-optic translucent hard coated polycarbonate lens for maximum output. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The conformal coated PC board and foam in place gasket shall provide additional protection against environmental elements. The 60CREGCS includes Hi/Low intensity mode standards and On/Off dual switch function. The solid state interior light shall be vibration resistant. The interior light is covered by a five year factory warranty. The white LED lights shall be activated when any cab door is in the open position automatically switching off all red lights currently on and reactivated when the door is closed.

LIGHTS, DOOR COURTESY
One Whelen TIR6 LED courtesy lights shall be mounted on the lower portion of each door panel. The lights shall activate when the door is opened.

MULTIPLE DOOR AND SAFETY WARNING INDICATOR PANEL
There shall be a door ajar and safety warning light system with indicator panel located in the cab. The panel is mounted to the ceiling between the driver and the officer. The indicator panel has multiple LED lights that activate under one or all of the following conditions: cab door is open, compartment door is open, and outrigger is not in the stowed position. An audible alarm shall be installed in conjunction with the door ajar and outrigger portion of the system. The panel only operates when the ignition switch is in the “On” position and the parking brake released.

LIGHTS, STEP WELL
Six TecNiq D04 Linear Dragon LED lights shall be provided, two in each front cab step well and one in each rear cab step well. Each light shall activate when the cab door is opened.

LIGHTS, SWIVEL MAP
A light module with dual map lights shall be located in the overhead panel, centered over the engine tunnel.

LIGHTS, ENGINE MAINTENANCE
Two white 4" LED round lights shall be mounted under the cab. The lights shall automatically activate when the cab is tilted.

FRONT LIGHTING
The headlamps, turn signals, front warning and intersection lights shall be located within warning light modules, painted with a black ruggedized material with one on each side front of the apparatus.

HEADLIGHTS
Four HID rectangular headlights shall be installed in the warning light modules, two each side. The headlights shall be mounted in the upper positions of the module.

DAYTIME RUNNING LIGHTS
The apparatus shall be equipped with Daytime Running Lights. This feature shall control 80% of the low beam headlamp illumination. The Daytime Running lights shall operate only when the ignition switch is in the "On" position and the parking brake is released. The headlight circuitry shall override the Daytime Running Lamp feature when the headlight switch is in the "On" position. The vehicle identification lamps shall not illuminate in the Daytime Running Lamp mode.

TURN SIGNALS, FRONT
Two Whelen M6 series LED model M6T turn signal lamps shall be installed, one each side directly below the low beam headlights in the warning light modules. The M6T configuration shall consist of 64 amber 5mm Super-LEDs® and an amber non-optic polycarbonate lens. The turn arrow, with the aid of two screws, shall have the ability to be installed as a surface mount warning light. The M6T shall include two Scan-Lock flash patterns of Steady (Brake) Default and SignalAlert™ Steady. The encapsulated assembly shall be resistant to water, moisture, dust, and other environmental conditions. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The light engine shall be installed at the rear of the unit and be vacuum tested to ensure proper sealing. The 5mm LED populated arrow shaped PC board shall be conformal coated for additional protection. The M6T shall be furnished with 6" unterminated pigtails, a rubber gasket, screws, and screw grommets shall be included for installation. The turn arrow light shall meet SAE specifications J1395, J588, and J1330. The M6T is covered by a five year factory warranty.

LIGHTS, TURN SIGNAL/MARKER
Two Whelen 400 series model 40A00AAR amber LED lights shall be mounted, one each side outboard of the turn signal at a 45° angle off the front of the cab. The lights shall be part of the warning light module and are visible from both the front and sides of the vehicle.

LIGHTS, LED CORNING
Two Whelen 400 series model 40R02Z*R flashing LED cornering lights shall be mounted, one each side below the marker lights in the warning light module. The lights shall be mounted at a 45° angle off the front of the cab and are visible from the sides and front of the vehicle. The warning light shall incorporate four red Super-LED, an optic hard coated polycarbonate lens, and utilize a metalized reflector with integrated TIR hybrid optics for maximum output. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The conformal coated PC board and with the lens fitted with foam in place gasket assembly shall provide additional protection against environmental elements. The solid state warning lights shall be vibration resistant. The self-contained flashing light shall have 25 Scan-Lock™ flash patterns including synchronize feature and steady burn. An installation kit including mounting hardware

and rubber gasket shall be provided for surface mounting. The 40R02Z*R will contain a 12" non-terminated pigtail. The warning light is covered by a five year factory warranty.

LIGHTS, FRONT DOT

There shall be five Whelen OS series LED marker lights installed on the cabs roof located as high as practical and spaced per DOT guidelines. These lights shall be incorporated into the brow light.

LIGHTS, INBOARD LOWER FRONT

Two Whelen M6 Series Super-LED model M6RC lights shall be installed, inboard of the turn signal in the warning light modules. The warning light shall incorporate red Super-LEDs, a clear non-optic hard coated polycarbonate lens, clear optic collimator and utilize a metalized reflector for maximum output. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The encapsulated lens/reflector assembly and conformal coated PC board shall provide additional protection against environmental elements. The solid state warning lights shall be vibration resistant. The self-contained flashing light shall have 164 Scan-Lock flash patterns including synchronize feature and steady burn. The warning light is covered by a five year factory warranty.

FRONT WARNING LIGHTS

A ROTO RAY LED warning light shall be installed on the front of the cab below the windshield. The light shall have three sealed beam lights (two red and one white) and rotate at 200 RPM in a vertical plane.

LIGHTS, CAB GROUND

There shall be one Whelen 2G Series model 20C0CDCD 4" LED light mounted under each cab door illuminating the area below providing a safe entrance and exit for cab occupants. All cab ground lights shall automatically activate when any cab door is opened and by a switch located on the dash. The 12 volt steady burn compartment lights shall incorporate 12 clear LED and a clear optic hard coated polycarbonate lens. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The encapsulated coated PC board and lens fitted with foam in place gasket assembly shall provide additional protection against environmental elements. The solid state compartment light shall be vibration resistant. The 20C0CDCD will contain 350 usable lumens. An installation kit including mounting hardware and rubber gasket shall be provided. The 20C0CDCD will contain a 12" terminated pigtail with a waterproof Deutsch® connector. The compartment light is covered by a five year factory warranty.

WIRELESS INTERCOM SYSTEM, FIRECOM

A wireless FIRECOM 5000D series intercom system shall be installed to provide noise suppression while providing clear voice communications for five seated positions in the cab. Communications are provided by five under the helmet headsets. This system includes intercom system, UH51 headsets, UH52 headsets, and optional mobile radio interface. The driver and officer headsets include the intercom and two-way radio communication functions, while the crew headsets are capable of intercom communications and radio communications listening.

MASTER INTERCOM STATION

A Firecom model 5100D with single radio monitoring and primary transmit selection intercom shall be provided and installed. This system shall have the capability of installing up to six positions for wireless base stations and/or wired headsets. A single auxiliary input/output for an MP3 player, cell phone interface, or GPS shall be provided. The control head shall have a touch pad with adjustable volume and squelch with advanced digital noise reduction. The intercom shall

have a rugged steel casing and a 12 volt nominal power supply. This intercom shall come with a two year warranty from date of purchase.

INTERFACE CABLES, MOBILE RADIO

The intercom system shall be provided with one Firecom mobile radio interface cable between the Departments radio and the Firecom system.

HEADSET, DRIVERS POSITION

There shall be a wireless under the helmet headset provided for the driver's position. The headset shall have radio transmit and intercom capabilities. The Firecom UH-51 wireless headset delivers all the benefits of hands-free, full-duplex communication with your crew. Operating with a stand-alone intercom system or integrated with a mobile radio, the flexible design brings all crew members into constant communication. Behind-the-head band configuration with adjustable over-head strap easily accommodates use with helmets. Water resistant and comfortable ear seals, extended operating temperature, and robust design make this headset ready for action in virtually any foreground environment. The headset shall have a two year warranty. There shall be one HM10 headset plug in module provided for the driver's headset. The module is used to connect the intercom via the module RJ-14 jack. The module features a connector guard to protect against moisture and dust.

HEADSET, OFFICERS POSITION

There shall be a wireless under the helmet headset provided for the officer's position. The headset shall have radio transmit and intercom capabilities. The Firecom wireless headset delivers all the benefits of hands-free, full-duplex communication with your crew. Operating with a stand-alone intercom system or integrated with a mobile radio, the flexible design brings all crew members into constant communication. Behind-the-head band configuration with adjustable over-head strap easily accommodates use with helmets. Water resistant and comfortable ear seals, extended operating temperature, and robust design make this headset ready for action in virtually any foreground environment. The headset shall have a two year warranty.

HEADSETS, CREW POSITIONS

There shall be three wireless headsets provided for the crew positions. The headsets shall have intercom only capabilities. The Firecom wireless headset delivers all the benefits of hands-free, full-duplex communication with your crew. Operating with a stand-alone intercom system or integrated with a mobile radio, the flexible design brings all crew members into constant communication. Broad padded headband remains comfortable for hours of wear. Water-resistant and comfortable ear seals, extended operating temperature, and robust design make this headset ready for action in virtually any fire ground environment. The headsets shall have a two year warranty.

BACK UP CAMERA SYSTEM

One Federal Signal model CAMSET-70 color camera system shall be installed on the vehicle. The system shall be wired to the vehicle's 12 volt electrical system. The 7" LCD color monitor shall be installed in cab in easy reach of the driver while in the seated position. The color camera shall be installed facing rearward giving a clear and unobstructed view behind the vehicle. The system shall activate when the transmission is shifted in the reverse position. A switch located on the monitor shall activate the system regardless of the transmissions shifted position. This system shall consist of the following components:

- One 7" CAMLCD color monitor installed in the cab
- One color camera model CAMCCD-REARNTSC with night vision and audio installed high at the rear of the vehicle
- 65.5' of camera-to-monitor extension cable (CAMCABLE-20)

- Multiple camera control box (CAMBOX-4NTSC/CAMBOX-PAL)
- Mounting bracket and hardware (CAMLCD-BRACKET)

ADDITIONAL CAMERA, OFFICER'S SIDE
One Federal Signal model CAMCCD-SIDETSC side view camera shall be installed on the officer's side of the vehicle wired to the monitor. The camera shall be equipped with night vision and audio.

CAB PAINT FINISH, SINGLE
The custom cab shall have a single paint finish. The paint color shall be furnished by the customer. All cab exterior components including doors and glass, shall be removed. The complete cab exterior shall be thoroughly sanded, solvent cleaned and finished with high luster polyurethane paint before mounting of body to assure full coverage of paint to all surfaces.

UPPER CAB PAINT FINISH
The upper cab exterior shall have no mounted components prior to painting to assure full coverage of metal treatments. These steps are followed as recommended by the paint manufacturer to provide a lasting and high quality gloss finish. All paint products shall be provided by DuPont.

UPPER CAB PAINT COLOR/CODE
The upper cab paint code shall be Red, 854008

PRIMARY/LOWER CAB PAINT FINISH
The primary/lower cab exterior shall have no mounted components prior to painting to assure full coverage of metal treatments. These steps are followed as recommended by the paint manufacturer to provide a lasting and high quality gloss finish. All paint products shall be provided by DuPont.

PRIMARY/LOWER CAB PAINT COLOR/CODE
The primary/lower cab paint code shall be Red, 854008.

CAB PAINT BREAK LINE STRIPE
This shall be determined at pre-construction meeting.

SAFETY SIGNS, GENERAL REQUIREMENTS
Safety signs with text shall conform to the general principles of ANSI/NEMA Z535.4, *Product Safety Signs and Labels*. Safety signs without text shall conform to the general principles for two-panel safety signs of ISO 9244, *Earth-Moving Machinery - Machine Safety Labels*. Apparatus built for sale in the United States shall employ safety signage that complies with ANSI/NEMA Z535.4. Apparatus built for sale outside the United States shall employ safety signage that complies with ANSI/NEMA Z535.4 or ISO 9244. Safety signs referenced in this standard beginning with the letters FAMA shall conform to the text and graphics of the referenced safety sign number found in FAMA TC010, *Standard Product Safety Sign Catalog for Automotive Fire Apparatus.* All signs must be permanently attached. Automotive tape is not acceptable.

CARRYING CAPACITY PLATE
A permanently attached carrying capacity plate in accordance with the current NFPA 1901 Standards shall be installed in plain view of the driver. The tag shall include the following: overall height, overall length, GVWR, and seating capacity.

SAFTEY SIGNS, SEATED & BELTED
Safety signs FAMA07, which warns of the importance of seat belt use, shall be visible from each seat that is intended to be occupied while the vehicle is in motion.

SAFETY SIGN, CAB EQUIPMENT MOUNTING
A safety sign FAMA10, which warns of the need to secure items in the cab, shall be visible inside the cab.

SAFTEY SIGN, FIRE SERVICE TIRE RATING
A safety sign FAMA12, which warns of the special requirements for fire service–rated tires, shall be visible to the driver entering the cab of any apparatus so equipped.

SAFETY SIGN, CAB SEATING
A safety sign FAMA14 shall be located in the cab visible to the operator. The sign shall read: "THIS VEHICLE HAS A SEATING CAPACITY OF 5 PERSONNEL. CARRYING ADDITIONAL PERSONNEL MAY RESULT IN DEATH OF SERIOUS INJURY."

SAFTEY SIGNS, HELMET WORN IN CAB
A safety sign FAMA15, which warns not to wear helmets while the vehicle is in motion, shall be visible from each seat that is intended to be occupied while the vehicle is in motion.

SAFETY SIGNS, CLIMBING METHOD INSTRUCTION
Safety signs FAMA23, which warns of the proper climbing method, shall be visible to personnel entering the cab and at each designated climbing location on the body.

SAFETY SIGNS, RIDING ON EXTERIOR
Safety signs FAMA24, which warns personnel not to ride on the vehicle, shall be located at the rear step areas and at any cross walkways.

PLATE, OVERALL HEIGHT/LENGTH/WEIGHT
An Overall Height/Length/Weight information plate shall be installed that can be clearly identified and visible to the driver while in the seated position showing the apparatus completed overall height, length, (in feet and inches) and gross vehicle weight (in tons) current to the apparatus manufactured date. If changes to the vehicle occur while in service, the department must revise the overall height-length-weight plate.

PLATE, FLUID CAPACITY
A permanently affixed fluid date plate shall be installed in the driving compartment to indicate the type and quantities of the following fluid used in the vehicle: Engine Oil, Engine Coolant, Chassis Transmission Fluid, Pump Transmission Lubrication Fluid (if applicable), Pump Primer Fluid (If Applicable), Drive Axle Lubrication Fluid, Air Conditioning Refrigerant, Air Conditioning Lubrication Oil, Power Steering Fluid, Cab Tilt Mechanism Fluid, Transfer Case Fluid, Equipment Rack Fluid, Air Compressor System Lubricant, Generator System Lubricant, Front Tire Pressure – Cold, And Rear Tire Pressure – Cold. The following information shall also be supplied on the Fluid Data Plate: Chassis Manufacturer, Production Number, Paint Number, Year Built, Date Shipped, and Vehicle Identification Number.

SAFETY SIGN, APPARATUS MOVEMENT
A permanently affixed movement warning plate shall be installed near the door ajar light that reads: "DO NOT MOVE APPARATUS WHEN LIGHT IS ON".

PUMP ENCLOSURE, SIDE CONTROL

The pump enclosure superstructure shall be constructed minimally of aluminum tubing, channel, angle, and break-formed components. The framework shall be formed by beveled aluminum alloy extrusions and electrically seam welded both internally and externally at each joint using 5356 aluminum alloy welding wire. The main, frame work shall be constructed of 3 x 3.5 6063-T6 aluminum extrusions. The break-formed components shall be constructed from 3/16" aluminum. The cross members support the substructure and the exterior panels independently from the cab and body. The cross members shall be isolated from the frame rails using torsion mounts. The pump enclosure shall be supported at the top of the frame rails, in a minimum of four places. The module shall be secured with angle brackets bolted to both the pump enclosure support cross rails and the side of the chassis frame rails. This design is required to eliminate shifting and stress on the pump enclosure, pump panels, and running boards. The front of the pump module shall be covered with aluminum tread plate to keep road debris from the front of the pump. The pump enclosure provides an area above the pump for the installation of crosslays or dunnage area. Any pump enclosure constructed using any material other than aluminum or utilizing any other mounting method is not acceptable.

SEPARATE PUMP MODULE

The pump module will be a self-supported structure mounted independently from the body and chassis cab. The pump module will be constructed entirely of extrusions and aluminum plate and shall be bolted to the chassis frame rails. The framework will be formed from beveled aluminum alloy extrusions and electrically seam welded both internally and externally at each joint using 5356 aluminum alloy welding wire. The main framework shall be 3 x 3.5 6063-T6 aluminum extrusion. Aluminum angle will be welded such that a recessed pump panel can be mounted inside the extrusion perimeter. The module shall be mounted to the chassis frame rails utilizing a "U" bolt spring mounting system. The pump module design must allow normal frame deflection without imposing stress on the pump module structure or side running boards.

PUMP PANELS

The operator's controls and gauges shall be mounted on pump panels constructed of 1/8" black anodized, non-glare aluminum. No vinyl coverings shall be acceptable as these surfaces are subjected to rough service and vinyl is susceptible to tearing. The operator's master gauge panel shall be vertically hinged with push style latch for access to gauges and auxiliary controls. The operator's control panel shall be located below the master gauge panel and constructed of 1/8" black anodized, non-glare aluminum. All gauges and controls shall be properly identified with color-coded metal tags. The tags shall be affixed with 3M brand industrial adhesive. The gauges shall be functionally grouped above each control. The right side upper panel shall be vertically hinged with double doors and push style latches for pump compartment access. The doors shall be constructed of 1/8" aluminum tread plate and painted with a black ruggedized material. The right side lower panel shall be removable for serviceability. The panel shall be constructed of 1/8" black anodized, non-glare aluminum. All instruments and controls shall be provided and installed as a group at the pump panel. The central midpoint or centerline of any valve control shall be no more than 72" vertically above the ground or platform that is designed to serve as the operator's standing position. The instruments shall be placed to keep the pump operator as far as practical from all discharge and intake connections and in a location where they are readily visible and operationally functional while the operator remains stationary. A safety sign FAMA25, which warns of the need for training prior to operating the apparatus, shall be located on the pump operator’s panel.

FULLY HINGED PUMP PANEL, RIGHT SIDE

One vertically hinged pump panel with push style latch shall be installed and constructed of the same material as stated in the pump module specifications. The hinged panel replaces the current

right hand lower removable panel for ease of access to the pump compartment during routine maintenance.

PUMP PANEL LIGHT, LEFT SIDE
One individual OnScene Access LED pump panel light with on/off switch shall be mounted under the light shield left side. For optimum visibility during nighttime operations, the light shall be mounted as high as possible.

PUMP PANEL LIGHT, RIGHT SIDE
One individual OnScene Access LED pump panel light with on/off switch shall be mounted under the light shield right side. For optimum visibility during nighttime operations, the light shall be mounted as high as possible.

LIGHT, PUMP COMPARTMENT
One LED compartment light shall be installed in the pump compartment for inspection or routine maintenance wired to the pump panel light switch.

RUNNING BOARD, LEFT SIDE
A running board shall be provided on the left side of pump module constructed of “Embossed” 3/16” aluminum tread plate flanged down and in 2.5” x 1” for maximum rigidity then bolted to the modules substructure to facilitate removal. The running board stepping surface shall comply with the latest version of NFPA 1901. The running board shall be painted with a black ruggedized material.

RUNNING BOARD, RIGHT SIDE
A running board shall be provided on the right side of pump module constructed of “Embossed” 3/16” aluminum tread plate flanged down and in 2.5” x 1” or maximum rigidity then bolted to the modules substructure to facilitate removal. The running board stepping surface shall comply with the latest version of NFPA 1901. The running board shall be painted with a black ruggedized material.

PUMP OPERATOR'S PLATFORM
One slide-out platform shall be installed under the operator's panel constructed from 3/16” aluminum tread plate. Two sealed roller bearing slides, with a total capacity of 500 pounds shall be installed one each side of the platform mechanically held in both the retracted and extended positions with a rugged quick-action latch. The slide-out platform shall be wired to the open door indicator system activating the light in the cab when the step is in the extended position. The platform and mounting accessories shall be painted with a black ruggedized material.

AIR OUTLET, PUMP PANEL
There shall be an air outlet with a valve installed on the pump panel. There shall be a 25' of .375" utility type air hose with "quick release" type fittings compatible with those on the apparatus provided. This shall be plumbed into the chassis air system.

AIR HORN SWITCH, PUMP PANEL
A push button momentary switch mounted on the pump panel shall activate the chassis air horns.

PRESSURE GAUGES, 2½"
The discharges shall be provided with 2½" pressure gauges. The discharge gauges shall be liquid filled with a solution to assure visual readings and reduce inner lens condensation. The body of the gauges shall be constructed of Zytel nylon with chrome-plated bezels. The face of the gauges shall be Spun Metal with black background and white markings reading from 0 to 400 PSI. The

gauges shall be installed at each discharge control on the pump operator's panel. On side mount pump applications with push pull handles each gauge shall incorporate a Thuemling Instrument Group one piece module assembly consisting of the gauge, push-pull and trim bezel. The pressure gauges shall maintain performance of all features and be free from defects in material and workmanship which includes fluid fill leakage and discoloration for seven years.

GAUGE BEZELS, COLOR CODED
The pump panel master and pressure gauge bezels shall be color coded.

PUMP PANEL TAGS
All discharges, gauges, and controls will be properly identified by color-coded metal tags. The metal tags shall not be affixed with 3M industrial adhesive. They must be mechanically attached.

PUMP SYSTEM, HALE QMAX SINGLE STAGE
The pump system shall be Hale QMAX single stage.

PUMP ASSEMBLY
The entire pump shall be cast, manufactured, 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. 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 specs as outlined by the latest NFPA Pamphlet No. 1901. The pump shall be free from objectionable pulsation and vibration. The pump body and related parts shall be of fine grain, cast iron alloy, with a minimum tensile strength of 30,000 PSI. All 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 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 high lead bronze sleeve bearing shall be located immediately adjacent to the impeller (on side opposite the drive unit). 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. The pump impeller shall be hard, fine grain bronze of the mixed flow design; accurately machined, hand-ground and individually balanced. The vanes of the impeller intake eyes shall be hand ground and polished to a sharp edge, and be of sufficient size and design to provide ample reserve capacity utilizing minimum horsepower. The 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, to be super-finished under packing with galvanic corrosion (zinc separators in packing) protection for longer shaft life. Pump shaft must be sealed with double lip oil seal to deep road dirt and water out of drive unit.

DRIVE UNIT
The drive unit shall be cast and completely manufactured and tested at the pump manufacturer's factory. Pump drive unit shall be of sufficient size to withstand up to 16,000 foot pounds of torque of the engine in both road and pump operating conditions. The drive unit is designed with ample capacity for lubrication reserve to maintain proper operating temperature. The gearbox drive shafts shall be of heat-treated chrome nickel steel and at least 2¾" in diameter, on both the input and output drive shafts. They shall withstand the full torque of the engine in both road and

pump operating conditions. All gears drive and pump, shall be of highest quality electric furnace, chrome nickel steel. Bores shall be ground to size and teeth integrated, crown-shaved 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 thrusts. The pump ratio shall be selected by the apparatus manufacturer to give maximum performance with the engine and transmission selected. If drive unit is equipped with a power shift, the shifting mechanism shall be a heat-treated, hard-anodized aluminum power cylinder, with stainless steel shaft. An in-cab control for rapid shift shall be provided that locks in road or pump. Three warning lights with plates shall be provided to alert the operator when the drive unit has fully shifted from road to pump position. Two lights shall be located on the cabs instrument panel and the other on the pump panel adjacent to the throttle. A 3" clapper check valve shall be installed between the suction side of the pump and the tank-to-pump valve. This 3" clapper valve shall remove the possibility of a water surge expanding the booster tank. Pump system shall have an integral discharge manifold system that allows a direct flow of water to all discharge valves.

PACKING GLANDS

The pump shaft shall have only one packing gland located on the inlet side of the pump. It shall be of split design for ease of repacking. The packing gland must be a full circle threaded design to exert uniform pressure on packing and to prevent "cocking" and uneven packing load when it is tightened. It shall be easily adjusted by hand with rod or screwdriver, with no special tools or wrenches required. The packing rings shall be of a unique, permanently lubricated, long life graphite composition and have sacrificial zinc foil separators to protect the pump shaft from galvanic corrosion.

PUMP SHIFT

An air operated pump shift shall be installed in the chassis cab to engage the fire pump. Provisions shall be made for placing the pump drive system in operation using controls and switches that are clearly identified and within convenient reach of the operator while in the cab. A green indicator light shall be installed on the cab dash and labeled "Pump Engaged". Where an automatic chassis transmission is provided, a green indicator light in the driving compartment and a green indicator light located at the pump operator's position shall be provided and shall be energized when both the pump shift has been completed and the chassis transmission is engaged in pump gear. The light in the driving compartment shall be labeled "Okay to Pump". The light on the pump operator shall be positioned adjacent to and preferably above the throttle control and shall be labeled "WARNING: DO NOT OPEN THROTTLE UNLESS LIGHT IS ON". The green light on the pump operator's panel shall be energized when the pump is engaged, the transmission is in drive, and the parking brake is set.

PRIMING SYSTEM, PUMP

The priming pump shall be a Trident Emergency Products automatic compressed air powered, high efficiency, multi-stage, venturibased AirPrime™ System. All wetted metallic parts of the priming system are to be of brass and stainless steel construction. A single panel mounted control will activate the priming pump and open the priming valve to the pump. The priming system shall have a five year warranty.

U.L. TEST POINTS

An Underwriters Laboratories approved engine speed counter shall be located on the pump panel to provide a means to certify the tachometer. In addition, two U.L. test plugs shall be pump panel mounted for testing of vacuum and pressures.

U.L. CERTIFICATION, 2,000 GPM

The vehicle shall be third party tested and certified by Underwriters Laboratories, Inc. UL testing is recognized as a leading, third party, product safety certification organization for over 100 years. UL has served on the NFPA (National Fire Protection Association) technical committee for over 30 years. The testing organization must meet the following minimum requirements:

- Must be nationally recognized testing laboratory recognized by OSHA
- Must comply with the ASTM (American Society for Testing Materials) standard E543 "Determining the qualifications for nondestructive testing agencies"
- Must have more than 40 years of Automotive Fire Apparatus safety testing experience and more than 15 years of factory aerial device testing and Certification experience
- Must not represent, be associated with, or in the manufacture or repair of automotive fire apparatus
- Must provide proof of $10,000,000 in excess liability insurance for bodily injury and property damage combined

The pump shall meet and perform the following test to receive a U.L. Certification.

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

PUMP TEST CERTIFICATION PLATE

A permanently affixed plate shall be installed at the pump operator's panel. It shall provide the rated discharge and pressures together with the speed of the engine as determined by the certification test for each unit. It shall also provide the position of the parallel/series pump used and the no load governed speed of the engine as stated by the engine manufacturer on a certified brake horsepower curve. A label shall be provided on the pump operator's panel that states the following: "WARNING: DEATH OR SERIOUS INJURY MIGHT OCCUR IF PROPER OPERATING PROCEDURES ARE NOT FOLLOWED". The pump operator, as well as, individuals connecting supply or discharge hoses to the apparatus must be familiar with water hydraulics hazards and component limitations.

SUCTION HEADERS

A 6" NST non-gated suction header with removable screen, and long handled cap shall be provided on the left side of the pump. A 6" NST non-gated suction header with removable screen, and long handled cap shall be provided on the right side of the pump.

INTAKE RELIEF VALVE

There shall be an Akron Model 59 suction side relief valve provided in the pump system. The relief valve is adjustable from 50 to 175 PSI and set at the factory at 125 PSI.

PRESSURE GOVERNOR

The apparatus shall be equipped with a Class 1 “Total Pressure Governor Plus” (TPG+) system.

MASTER GAUGES, 4½"

Two compound 4½" master gauges shall be provided and installed on the pump operator's panel. The intake and discharge gauges are liquid filled with a solution to assure visual readings and reduce inner lens condensation. The body of the gauges shall be constructed of Zytel nylon with chrome-plated bezels. The face of the gauges shall be Spun Metal with black background and white markings accurate within 1%. The pressure gauges shall maintain performance of all features and be free from defects in material and workmanship which includes fluid fill leakage and discoloration for seven years.

FILL SUBSURFACE/RETURN LINE
There shall be one subsurface/return line installed in the booster tank. The subsurface/return line shall prevent aeration of the water in the booster tank under low water conditions. The subsurface/return line piping shall be of the same size as the “Tank Fill”.

TANK TO PUMP
One 3” ball valve shall be installed between the pump and the water tank. The tank to pump valve shall be a quarter turn fixed pivot design constructed from bronze. The valve shall be controlled by a chrome push/pull locking “T” handle installed at the left pump panel.

FOAM SYSTEM
There shall be a Hale FoamLogix 3.3 fully automatic electronic direct injection foam proportioning system furnished and installed on the apparatus. The system shall be equipped with a digital electronic control display. It shall be installed on the pump operators panel and enable the pump operator to perform the following control and operation functions:

STAINLESS STEEL FOAM MANIFOLD
The foam manifold shall be constructed of stainless steel.

FLOWMETER, 2½" TEE MOUNT W/COUPLING KIT
There shall be a paddle wheel style flowmeter mounted in a 2½" NPT pipe tee for mounting in a 2½" discharge line. A groove less Victaulic coupling shall be provided for installation of the flowmeter. A water check valve shall be installed before the flowmeter and between the water pump and the foam injection point.

FOAM PROPORTIONING SYSTEM TEST
Testing shall be performed in accordance with NFPA 1901.

NFPA 1901 PERFORMANCE REQUIREMENTS
The proportioning system shall be capable of proportioning foam concentrate in accordance with the foam concentrate manufacturer's recommendation for the type of foam concentrate used in the system over the system's design range of flow and pressure. The foam proportioning systems water flow characteristics and the range of proportioning ratios shall be specified. The foam system shall comply with NFPA 1901 Chapter 17.0 as it relates to the specified system.

FOAM TANK PIPING
The foam supply line shall be non-collapsible. There shall be a means provided to prevent water backflow in to the foam proportioning system and storage tanks. Either a filter or strainer provided on the foam concentrate supply side of the foam proportioning to prevent any debris that may affect the operation of the foam proportioning system from entering the system. The strainer assembly shall consist of a removable straining element, housing, and retainer. The strainer assembly shall allow full flow capacity of the foam supply line.

FLUSHING
Foam concentrate system flush lines shall be provided as required by the foam system manufacturer. The design shall incorporate a means to prevent water backflow into the concentrate tank or water tank during the flushing operation. Where the foam proportioning system is connected to more than one foam storage tank, provisions shall be made to flush all common lines to avoid contamination of dissimilar foam concentrates.

CONTROLS FOR FOAM SYSTEM

The foam proportioning system operation controls shall be located at or near the pump operator's position and shall be clearly labeled. All foam-proportioning systems that require flushing shall provide controls, which enable the operator to flush the system in accordance with the foam manufacturer's instructions. Foam proportioning systems that incorporate foam concentrate metering valves shall have each metering valve calibrated to indicate the rate(s) of flow of the foam concentrate proportioning available as determined by the design of the system. Foam proportioning systems that incorporate automatic proportioning features shall be equipped with controls, which enable the operator to isolate the automatic feature and operate the system in a manual mode.

NAMEPLATE, LABELS, INSTRUCTION SPECIFICATIONS

There shall be a nameplate provided that is clearly marked with the identification and function of each control gauge and indicator related to the foam proportioning system. There shall be a label provided on the operator's panel that identifies the type(s) of foam concentrate(s) the system is designed to use. This label shall state the minimum/maximum foam-proportioning rate at the minimum/maximum foam proportioning rated system flow and pressure. Foam proportioning system instruction plate shall be provided. This includes a minimum piping schematic of the system and basic operating instructions. Two copies of an operations and maintenance manual shall be provided. These manuals shall include a complete diagram of the system, along with operating instructions and details outlining all recommended maintenance procedures.

FOAM PROPORTIONING SYSTEM TESTING

The apparatus manufacturer shall test the accuracy of the foam proportioning system prior to delivery of the apparatus. If the manufacturer's rated proportioning ratio is below 3%, the foam system shall proportion foam concentrate within 0% /+40% of the manufacturer's rated proportioning ratio across the manufacturer stated range of water flow and pressure. If the manufacturer's rated proportioning ratio is above 3%, the foam system shall proportion foam concentrate within 0% /+40% of the manufacturer's rated proportioning ratio or one percentage point, whichever is less across the manufacturer's stated range of water flow and pressure.

GAUGE, FOAM LEVEL

A Fire Research TankVision Pro model WLA360-A00 tank indicator kit shall be installed on the pump operator’s panel. The kit shall include an electronic indicator module, a pressure sensor, a 10' sensor cable and a tank vent. The indicator shall show the volume of Class A foam concentrate in the tank on nine easy to see super bright RGB LEDs. A wide view lens over the LEDs shall provide for a viewing angle of 180°. The indicator case shall be waterproof, manufactured of Polycarbonate/Nylon material, and have a distinctive green label. The program features shall be accessed from the front of the indicator module. The program shall support self-diagnostics capabilities, self-calibration, six programmable colored light patterns to display tank volume, adjustable brightness control levels and a datalink to connect remote indicators. Low water warnings shall include flashing LEDs at ¼ tank, down chasing LEDs when the tank is almost empty, and an output for an audio alarm.

LOW TANK LEVEL SWITCH

A low tank level switch shall be installed in each foam concentrate tank that supplies the foam proportioning system. The low tank level sensor shall be connected to the foam proportioning system to provide protection against dry running of the foam pump. The low tank level sensor can be mounted on the side, bottom, or top 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.

OPERATING SYSTEMS INSTRUCTION PLACARD, SINGLE TANK

There shall be a placard installed on the pump panel, a schematic of the Foam Pro (single tank) operating system, which has been installed.

FOAM TANK NO. 1

The foam tank shall have a capacity of 20 gallons designed as an integral part of the water tank and shall have a manual fill tower. The fill tower shall be constructed of ½" PT3™ polypropylene and shall be a minimum dimension of 8" x 8" outer perimeter. Each foam fill tower shall be constructed of a colored material (yellow, green and black) indicating which tower is to receive each type of foam utilized. The capacity of the tank shall be engraved on the top of the fill tower lid. The tower shall be located in the right front corner of the tank unless otherwise specified. The tower shall have a ¼" thick removable polypropylene screen and a stainless steel hinged-type cover. Inside the fill tower, approximately 1½" down from the top, there shall be an anti-foam fill tube that extends down to the bottom of the tank. A pressure vacuum vent shall be provided in the lid of the fill tower.

FOAM TANK NO. 1 REFILL SYSTEM, HALE EZ-FILL

The apparatus shall be equipped with an electric, automatic, concentrate refill system. System shall operate independently of the foam proportioning allowing simultaneous sue. Refill operation shall not require apparatus or fire pump to be running. They system shall be capable of handling Class A or Class B foam concentrates, emulsifiers, gels and decontamination concentrates. The apparatus shall be plumbed from the externally accessed intake/flush ports to the concentrate cell following manufacturer's recommendations. The refill operation shall be based on direct measurement of concentrate level in tank. System must be capable of automatically stopping when cell is full and include a manual override feature. The system shall be equipped with an electronic control suitable for installation on the pump panel. Incorporate within the control shall be a microprocessor that receives input from the system while controlling foam concentrate pump output. An all bronze three-way valve shall be included to allow the operator to flush the system after use. Valve control, intake, and flush ports shall be located within corresponding panel plate. The system shall enable the operator to perform the following control/operation functions and status indicators for the refill operation: provide push button start/stop control of foam refill, solid green light advises operator concentrate cell is full, flashing green indicates system is running, green light off, system off, allow override of "full tank" condition, and provide a means to flush the pump and intake piping. System shall include a 12V electric motor driven, positive displacement concentrate pump. Pump deliver minimum flow of 10 GPM at 20 PSI with all concentrates currently utilized in fire apparatus. Pump body to be of all bronze construction and other wetted components and piping to be constructed of non-corrosive materials. The system shall draw a maximum of 38 amps at 12V DC. A pump/motor solenoid (mounted on the base of the pump) shall receive signals from the computer control display and readings when the concentrate tank is full and stop operation to prevent overfill. Components of the complete refill system shall include: operator control and display with Weather- Pac connectors, refill/flush, quick connect cam-lock fittings and cap, check valves, pump/motor assembly and solenoid, strainer, tank level switch, three way fill/ flush valve, stainless steel pick up wand and 6' of reinforced suction hose, 1' in diameter to allow maximum flow, and panel placards. An installation and operations manual shall be provided, along with a one year limited warranty. When two types of concentrates are to be used, a separate refill system must be specified for each.

FOAM OUTLETS

Foam shall be plumbed to the following outlets: Front Bumper Discharge, No. 1 Crosslay, No. 2 Crosslay, and No. 3 Crosslay.

VALVE, MASTER DRAIN
There shall be a master drain valve recessed mounted below the pump module under the side running board, connecting all drain lines, with the capacity to discharge water simultaneously from all locations to below the chassis frame rails.

VALVE, INDIVIDUAL DRAIN
All lines shall drain through the master drain valve or shall be equipped with individual drain valves, easily accessible and labeled. One individual quarter turn drain valve shall be furnished for each 1½" or larger discharge port and each 2½" gated auxiliary suction. The drain/bleeder valves shall be located at the bottom of the side pump module panels. All drains and bleeders shall discharge below the running boards.

TANK FILL
There shall be a 2" pump to tank fill line installed, with a 2" inline bronze valve and high-pressure flexible hose tested to 1,200 PSI. The valve shall be (locking "T" handle) push-pull controlled at the pump operator's panel.

ENGINE COOLER
The engine cooler shall be installed in-line from the discharge side of the pump, and installed in the engine cooling system. There shall be ½" quarter turn valve installed thru the pump panel and shall be clearly labeled.

PUMP COOLER
The pump shall have a 3/8" line installed from the pump discharge, to the water tank to cool the pump during long periods of pumping when water is not being discharged. The pump cooler shall be controlled from the pump operator's panel by a 3/8 " valve consisting of a cast bronze body with quarter turn chrome plated bronze ball, reinforced Teflon seals, and blow-out-proof stem rated to 600 PSI. The valve shall be installed thru the pump panel and clearly labeled.

PLUMBING SYSTEM
All suction and discharge lines of 2" or larger shall be constructed of a minimum of Schedule 40 galvanized steel pipe, where vibration or chassis flexing may damage or loosen threaded pipes, Victaulic or Roustabout couplings shall be used. All suction and discharge outlets shall have National Standard Threads (NST) and designed for 500 PSIG including, valves, drain cocks, lines, intake, and outlet closures, excluding the tank fill and tank to pump lines (tank side of the valves).

PUMP PAINTING
The pump shall be painted black in color.

AKRON PUSH-PULL CONTROL VALVE PACKAGE
All discharge valves shall be Akron Heavy-Duty Swing-Out push/pull controlled from the pump operator's panel unless otherwise specified. The Akron Swing-Out Heavy-Duty valves are designed for operating pressures to 250 PSI (17 bars)

- Ten year warranty against manufacturer's defects
- Available in 1" to 4" sizes
- 90° handle travel 316 stainless steel ball with Hydromax technology
- Improved sealing & increased gating ability
- Flow optimization reduces turbulence while in the gated position and requires lower operating forces
- No lubrication or regular maintenance required

- Simple two seated design (no O-Rings to cut or lose during assembly or maintenance)
- Wide range of available adapters
- Designed and tested to exceed NFPA requirements

All valve packages shall meet current NFPA 1901 Standards for valve operating speeds when controlled by gear, electric actuator, or slow close device.

SUCTION, 2½" LEFT FRONT PANEL

One 2½" swing operated ball valve shall be installed at the pump panel, left front plumbed to the suction side of the pump with 2½" inch piping, 2½" FNST chrome inlet swivel, brass inlet strainer, chrome plug with chain, and 3/4" drain valve. A warning plate permanently affixed in close proximity of the suction inlet shall be installed stating: "WARNING - SERIOUS INJURY OR DEATH COULD OCCUR IF INLET IS SUPPLIED BY A PRESSURIZED SOURCE WHEN THE VALVE IS CLOSED".

DISCHARGE ELBOWS

All 2½" side discharge outlets shall terminate with chrome-plated 30° elbows with 2½" MNST threads, 2½" by 1½" NST chrome reducers, 1½" chrome vented cap and chain. Caps shall automatically release pressure in the discharge outlet before the threads are completely disengaged unless the outlet and the cap are equipped with drains or bleeder valves.

DISCHARGE DRAIN VALVES

All discharges shall be equipped with automatic drain valves.

FRONT BUMPER DISCHARGE

There shall be one front discharge installed thru the gravelshield, driver's side outboard of the frame rail. The front bumper discharge shall terminate 2" NPT x 1½" NST with a 90° swivel. One 2" brass valve with 3/4" automatic drain shall be installed on the discharge side of the pump plumbed to the front swivel with flexible high-pressure hose and victaulic stainless steel couplings tested to 1,200 PSI, the front discharge shall be push/pull controlled at the pump operator's panel. A tread plate stop shall be provided preventing the front bumper discharge swivel from incidental contact with the cab. The stop shall be painted with a black ruggedized material.

NO. 1 CROSSLAY, 1¾" DOUBLE LAY

One pre-connected crosslay compartment shall be provided above the side mount operator's panel accommodating 200' of 1¾" double jacket hose. Stainless steel nylon guided rollers shall be installed at each end with stainless steel scuff plates around the perimeter to protect the painted surface. One 2" ball valve with mechanical swivel shall be installed. The valve shall be plumbed to the crosslay with 2" high-pressure flexible hose and stainless steel couplings. The high pressure hose shall be tested to 1,200 PSI. The crosslay valve shall be push-pull controlled at the pump operator's panel. Each discharge is equipped with an automatic drain valve. Threaded connection for crosslay shall be located as close to the side panel as possible. Crosslay height shall be a maximum of 68" from the ground level.

NO. 2 CROSSLAY, 1¾" DOUBLE LAY

One pre-connected crosslay compartment shall be provided above the side mount operator's panel accommodating 200' of 1¾" double jacket hose. Stainless steel nylon guided rollers shall be installed at each end with stainless steel scuff plates around the perimeter to protect the painted surface. One 2" ball valve with mechanical swivel shall be installed. The valve shall be plumbed to the crosslay with 2" high-pressure flexible hose and stainless steel couplings. The high pressure hose shall be tested to 1,200 PSI. The crosslay valve shall be push-pull controlled at the

pump operator's panel. Each discharge is equipped with an automatic drain valve. Threaded connection for crosslay shall be located as close to the side panel as possible. Crosslay height shall be a maximum of 68” from the ground level.

NO. 3 CROSSLAY, 2½" DOUBLE LAY

One pre-connected crosslay compartment shall be provided above the side mount operator's panel accommodating 200’ of 1¾" double jacket hose. Stainless steel nylon guided rollers shall be installed at each end with stainless steel scuff plates around the perimeter to protect the painted surface. One 2½" ball valve with mechanical swivel shall be installed. The valve shall be plumbed to the crosslay with 2½" high-pressure flexible hose and stainless steel couplings. The high pressure hose shall be tested to 1,200 PSI. The crosslay valve shall be push-pull controlled at the pump operator's panel. Each discharge is equipped with an automatic drain valve. Threaded connection for crosslay shall be located as close to the side panel as possible. Crosslay height shall be a maximum of 68” from the ground level.

CROSSLAY DIVIDERS

Two crosslay hosebed dividers shall be provided manufactured from ¼" smooth aluminum plates, extruded aluminum bases mounted in an extruded track for horizontal adjustment, with radius corners, and DA sanded to prevent damage to the hose.

CROSSLAY COVER

There shall be a Hypalon crosslay cover provided with the apparatus secured by twist-lock connectors along the top, and Velcro closures on each end protecting the crosslay hose. The cover prevents hose from inadvertently deploying during normal operations meeting the current NFPA requirements. A safety sign FAMA22, which warns of the need to secure hose, shall be visible to personnel at the hose storage area. The covers shall be black in color.

DISCHARGE, 2½" LEFT FRONT PANEL

One Akron 2½" Heavy-Duty ball valve with automatic drain shall be installed at the pump panel left front plumbed to the discharge side of the pump push/pull controlled from the pump operator's panel.

DISCHARGE, 2½" LEFT REAR PANEL

One Akron 2½" Heavy-Duty ball valve with automatic drain shall be installed at the pump panel, left rear, plumbed to the discharge side of the pump push/pull controlled from the pump operator's panel.

AERIAL WATERWAY DISCHARGE

The aerial waterway discharge shall be provided with a 4” full-flow brass valve with Teflon ball. The waterway discharge shall be connected from the pump to the aerial waterway with the use of heavy steel pipe. The discharge valve shall be hand wheel controlled. The control shall be located at the left side pump panel and shall have a liquid filled 2½" pressure gauge.

FLOWMETER, PUMP PANEL

There shall be one Fire Research Insight model DFA 400-040 digital flowmeter kit shall be installed, per NFPA 1901, section 19.12.7, to monitor the flow of the aerial waterway. The flow meters display shall be located on the pump operator's panel left side. The kit shall include a display module, paddle wheel flow sensor, sensor housing with a mount and a 10' sensor cable. The flowmeter case shall be waterproof, manufactured of anodized machined aluminum, and have dimensions not to exceed 3¼" high x 3¼" wide x 2½" deep. It shall have an LED display with super bright digits more than ½" high. Flow rate shall be displayed in GPM (Gallons per Minute).

SUCTION, 2½" RIGHT FRONT PANEL
One 2½" swing operated ball valve shall be installed at the pump panel, right front plumbed to the suction side of the pump with 2½" piping, 2½" FNST chrome inlet swivel, brass inlet strainer, chrome plug with chain, and ¾" drain valve. A warning plate permanently affixed in close proximity of the suction inlet shall be installed stating: "WARNING - SERIOUS INJURY OR DEATH COULD OCCUR IF INLET IS SUPPLIED BY A PRESSURIZED SOURCE WHEN THE VALVE IS CLOSED".

DISCHARGE, 3" RIGHT FRONT PANEL
One Akron 3" Heavy-Duty (Slo-Close) ball valve with automatic drain shall be installed at the pump panel, right front, plumbed to the discharge side of the pump equipped with 5" Storz connection, controlled at the pump operator's panel.

DISCHARGE, 2½" RIGHT REAR PANEL
One Akron 2½" Heavy-Duty ball valve with automatic drain shall be installed at the pump panel, right rear, plumbed to the discharge side of the pump push/pull controlled from the pump operator's panel.

DISCHARGE, 2½" LEFT REAR
One Akron 2½" Heavy-Duty ball valve with automatic drain shall be plumbed to the left rear of the apparatus terminating 2½" FNPT x 2½" MNST with chrome cap and chain push-pull controlled at the pump operator's panel.

WATER TANK
The tank shall have a capacity of 500 U.S. gallons and shall be constructed of PT3™ polypropylene material. This material shall be a non-corrosive stress relieved thermoplastic and UV stabilized for maximum protection. Tank shell thickness may vary depending on the application and may range from ½" to 1" as required. Internal baffles are generally 3/8" in thickness.

ISO CERTIFICATION
The tank must be rectangular in design and fabricated by a tank manufacturer that is ISO 9001:2008 certified in each of its locations. The ISO certification must be to the current standard in effect at the time of the design and fabrication of the tank.

DESIGN
Each tank is designed to the customer's specification and/or drawing submittal. An approval drawing is sent to the customer prior to commencing manufacturing. Upon receipt of the signed approval drawing, the tank is scheduled for production.

CONSTRUCTION
The booster and/or foam tank shall be of a specific configuration and is so designed to be completely independent of the body and compartments. Joints and seams shall be fused using nitrogen gas as required and tested for maximum strength and integrity. The tank construction shall include PolyProSeal™ technology wherein a sealant shall be installed between the plastic components prior to being fusion welded. This sealing method shall provide a liquid barrier offering leak protection in the event of a weld compromise. The top of the booster tank is fitted with removable lifting assembly designed to facilitate tank removal. The transverse and longitudinal swash partitions shall be manufactured of a minimum of 3/8" PT3™ polypropylene. 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. All swash partitions interlock with one another and are completely fused to each other as well as to

the walls of the tank. All partitions and spacing shall comply with NFPA 1901. The walls shall be welded to the floor of the tank providing maximum strength as part of the tank's unique Full Floor Design™. Tolerances in design allow for a maximum variation of 1/8" on all dimensions.

WATER FILL TOWER AND COVER

The tank shall have a combination vent and manual fill tower. The fill tower shall be constructed of ½" PT3™ polypropylene and shall be a minimum dimension of 8" x 8" outer perimeter. The fill tower shall be blue in color indicating that it is a water-only fill tower. The tower shall be located in the left front corner of the tank unless otherwise specified by the tank manufacturer to the purchaser. The tower shall have a ¼" thick removable polypropylene screen and a PT3™ polypropylene hinged cover. The capacity of the tank shall be engraved on the top of the fill tower lid. Inside the fill tower there shall be a combination vent/overflow pipe. The vent overflow shall be a minimum of schedule 40 polypropylene pipe with a minimum I.D. of 4" that is designed to run through the tank, and shall be piped to discharge water behind the rear wheels as required in NFPA 1901 so as to not interfere with rear tire traction. The tank cover shall be constructed of ½" thick PT3™ polypropylene and UV stabilized, to incorporate a multi-piece locking design, which allows for individual removal and inspection if necessary. The tank covers shall be flush or recessed 3/8" from the top of the tank and shall be fused to the tank walls and longitudinal partitions for maximum integrity. Each one of the covers shall have hold downs consisting of 2" minimum polypropylene dowels spaced a maximum of 40" apart. These dowels shall extend through the covers and shall assist in keeping the covers rigid under fast filling conditions. A minimum of two lifting dowels shall accommodate the necessary lifting hardware.

SUMP

There shall be one sump standard per tank. The sump shall be constructed of a minimum of ½" PT3™ polypropylene and be located in the left front quarter of the tank, unless specified otherwise. On all tanks that require a front suction, a 3" schedule 40 polypropylene pipe shall be installed that shall incorporate a dip tube from the front of the tank to the sump location. The sump shall have a minimum 3" NPT threaded outlet on the bottom for a drain plug per NFPA. This shall be used as a combination clean-out and drain. All tanks shall have an anti-swirl plate located approximately 3" above the inside floor.

OUTLETS

There shall be two standard tank outlets: one for the tank-to-pump suction line, which shall be sized to provide adequate water flow to the pump; and, one for tank fill line, which shall be sized according to the NFPA minimum size chart for booster tanks. 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-the-tank sleeves to accommodate rear discharge piping must be specified. All auxiliary outlets and inlets must meet all NFPA guidelines in effect at the time of manufacture.

MOUNTING

The UPF Poly-Tank® III shall rest on the body cross members in conjunction with such additional cross members, spaced at a distance that would not allow for more than 530 square inches of unsupported area under the tank floor. In cases where overall height of the tank exceeds 40", cross member spacing must be decreased to allow for not more than 400 square inches of unsupported area. The tank must be isolated from the cross members through the use of hard rubber strips with a minimum thickness and width dimension of ¼" x 1" and a Shore A Hardness of approximately 60 durometer. The rubber must be installed so it shall not become dislodged during normal operation of the vehicle. Additionally, the tank must be supported around the entire bottom outside perimeter and captured both in the front and rear as well as side to side to

prevent tank from shifting during vehicle operation. A picture frame type cradle mount with a minimum of 2" x 2" x ¼" mild steel, stainless steel, or aluminum angle shall be provided or the use of corner angles having a minimum dimension of 4" x 4" x ¼" by 6" high are permitted for the purpose of capturing the tank. Although the tank is designed on a free floating suspension principle, it is required that the tank have adequate vertical hold down restraints to minimize movement during vehicle operation. If proper retention has not been incorporated into the apparatus hose floor structure, an optional mounting restraint system shall be located on top of the tank, half way between the front and the rear on each side of the tank. These stops can be constructed of steel, stainless steel or aluminum angle having minimum dimensions of 3" x 3" x ¼" and shall be approximately 6" to 12" long. These brackets must incorporate rubber isolating pads with a minimum thickness of ¼" inch and a hardness of 60 durometer affixed on the underside of the angle. The angle should then be bolted to the body side walls of the vehicle while extending down to rest on the top outside edge of the upper side wall of the tank. Hose beds floors must be so designed that the floor slat supports extend full width from side wall to side wall and are not permitted to drop off the edge of the tank or in any way come in contact with the individual covers where a puncture could occur. Tank top must be capable of supporting loads up to 200 lbs. per sq. foot when evenly distributed. Other equipment such as generators, portable pumps, etc. must not be mounted directly to the tank top unless provisions have been designed into the Poly-Tank® III for that purpose. The tank shall be completely removable without disturbing or dismantling the apparatus structure.

CAPACITY CERTIFICATION

All water and foam tanks shall be tested and certified as to capacity on a calibrated and certified tilting scale. Each tank shall be weighed empty and full to provide precise fluid capacity. Each Poly-Tank® III is delivered with a Certificate of Capacity delineating the weight empty and full and the resultant capacity based on weight. Engineering estimates for capacity calculations shall not be permitted for capacity certification.

TANKNOLOGY™ TAG

A tag shall be installed on the apparatus in a convenient location and contain pertinent information including a QR code readable by commercially available smart phones. The information contained on the tag shall include the capacity of the water and foams, the maximum fill and pressure rates, the serial number of the tank, the date of manufacture, the tank manufacturer, and contact information. The QR code shall allow the user to connect with the tank manufacturer for additional information and assistance.

WATER TANK SIZE CERTIFICATION

The manufacturer shall certify the capacity of the water tank prior to the delivery of the apparatus. This capacity shall be recorded on the manufacturer's record of construction and the certification shall be provided when the apparatus is delivered.

GAUGE, WATER LEVEL

A Fire Research TankVision Pro model WLA300-A00 tank indicator kit shall be installed on the pump operator's panel. 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 easy to see super bright RGB LEDs. A wide view lens over the LEDs shall provide for a viewing angle of 180°. The indicator case shall be waterproof, manufactured of Polycarbonate/Nylon material, 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, six programmable colored light patterns to display tank volume, adjustable brightness control levels and a datalink to connect remote indicators. Low water warnings shall include flashing LEDs at ¼ tank, down chasing LEDs when the tank is almost empty, and an output for an audio alarm.

GAUGE, AUXILIARY WATER LEVEL

There shall be a pair of Whelen "PS Tank" water level status lights, with 96 steady burn green, blue, amber, and red LEDs. The light shall provide bright, easy indication of water status. The unit is surface mounted, has low current consumption, fully encapsulated, and carries a five year warranty from Whelen. The lights shall be mounted per customer requirements, typically one each side on or near the cab. The units shall activate with the application of the park brake.

AERIAL BODY

The apparatus body and subframe shall be constructed entirely of aluminum plate and extrusions.

CRADLE, WATER TANK

The water tank cradle shall be located at the forward portion of the apparatus body and shall be of an all welded construction. Longitudinal and latitudinal members of the cradle shall be spaced on centers sufficient to support the specified water tank. The tank shall be captured front-to-rear and side-to-side with vertical corner sections. The booster tank and cradle shall be isolated through a heavy-wall, C-channel neoprene extrusion. Absolutely no pop-rivets, screws or any other hardware shall be used to hold the rubber tank cushion in place.

BODY CONSTRUCTION

All body compartment floors shall be formed from .1875" aluminum tread plate and shall be painted with a black ruggedized material. The floors shall be welded in place with a continuous weld all around the perimeter to insure maximum strength and water tightness. The external compartment tops shall be constructed of .125" aluminum tread plate. This tread plate shall be painted with a black ruggedized material. The compartment tops shall be bolted in place to allow ease of removal for easy access to the body wiring harnesses. The compartment side walls shall be of one piece construction. The walls shall be formed from .1875" 5052 H-32 smooth aluminum plate to add strength to the compartment shelving. Each front body corner shall be a 3½" x 9¾" 6063 T-6 aluminum alloy extruded corner section with .210" wall thickness and welded as an integral part of the body. This extrusion shall have a large 1" corner radius. The corner sections shall have provisions for easy removal of a panel inside each forward compartment to provide ready access to body wiring harnesses. The horizontal and vertical frame member extrusions shall be 2.0" x 4.0" with a .190" wall thickness. The extrusion shall be made from 6063 T6 aluminum alloy. This extrusion shall have .190" outside radius corners. The longitudinal frame member, below the lower compartments shall be a 2.0" x 4.0" 6063 T6 aluminum alloy extrusion with .190" radius corners.

COMPARTMENT CONSTRUCTION

All body compartment floors shall be formed from .1875" aluminum tread plate. Floors shall be painted with a black ruggedized material. The floors shall be welded in place with a continuous weld all around the perimeter to insure maximum strength and water tightness. The external compartment tops shall be constructed of .125" aluminum tread plate. The compartment tops shall be bolted in place to allow ease of removal for easy access to the body wiring harnesses. The compartment side walls shall be of one piece construction. The walls shall be formed from .1875" 5052 H-32 smooth aluminum plate to add strength to the compartment shelving. Interior rear walls of all compartments shall have Pack Trac panels installed. The compartment seams shall be sealed with permanent pliable silicone caulking and each compartment shall be louvered to provide adequate ventilation. The compartment seams shall be sealed with permanent pliable silicone caulking. Each compartment shall be vented through a louver that is machined stamped in a panel located in each body corner extrusion. The panel shall be removable to provide access to service wiring and other mounted components.

ACCESS DOOR, STABILIZER MANUAL OVERRIDE

There shall be a hinged door in the driver side outrigger panel to provide access to the stabilizer manual override block. The door shall be made from aluminum diamond plate and shall be painted with a black ruggedized material. It shall measure approximately 9" wide x 9" high and have a stainless steel piano hinge and a push button latch. The door shall have a gasket on the inside.

WHEEL WELL PANELS, PAINTED ALUMINUM

The wheel well shall be constructed from 2" x 4" x .190" wall thickness. The extrusion shall be made from 6063T6 aluminum alloy and have .190" outside radius corners. The extrusion shall be slotted the full length to permit an internal fit of 3/16" (.187") painted aluminum panels. The wheel well liners shall be constructed of 3003 H-14 smooth aluminum plates. They shall be bolted in place for ease of maintenance. The wheel well fenderettes shall be constructed of a #304 Stainless steel with a black ruggedized finish. A deflection shield shall be mounted to the body subframe to keep road debris from entering the water tank area.

COMPARTMENTS, LEFT SIDE

All compartments will be built to allow for the largest cubic feet of storage space as possible.

L1 - There shall be one high side compartment over the front outriggers. This compartment shall have one horizontally hinged lift up style door.

L2 - There shall be one compartment forward of the rear wheels. This compartment shall have one vertically hinged lift up style door.

L3/L4 - There shall be one high side compartment over the rear wheels. The compartment shall have two door openings. Each compartment shall have one horizontally hinged lift up style door.

L5 - There shall be one high side compartment over the rear outrigger. This compartment shall have one horizontally hinged lift up style door.

L6 - There shall be one compartment ahead of the rear outrigger. This compartment shall have one vertically hinged door.

L7 - There shall be one compartment behind the rear outrigger. This compartment shall have one vertically hinged door.

HOSE CHUTE, LEFT REAR

There shall be one hose deployment opening at the left rear of the apparatus allowing easy removal of the fire hose. The hose opening shall have a door constructed from .125" aluminum tread plate. The door shall be painted with a black ruggedized material. The door shall have a stainless steel piano type hinge with quarter turn latch mechanisms.

HOSE TRAY, LEFT REAR

One heavy duty E-Z Stack roll-out hose tray shall be installed in the left rear of the body with a vertically hinged smooth aluminum plate door and positive latching assembly. The roll out hose tray shall have the capacity of storing 250' of 2½" double jacket fire hose. The tray shall be manufactured from ¼" smooth aluminum plate with two oval shaped access holes large enough to accommodate gloved hands, mounted on roller bearing locking slides for ease of operation.

COMPARTMENT DOORS, LEFT SIDE HINGED

The specified left side compartment doors shall be constructed entirely from 5052-H32 smooth aluminum plate using a box pan configuration. The outer panel shall be constructed from 3/16" smooth aluminum plate and the inner pan stitch welded in place from 1/8" smooth aluminum plate. There shall be a ¼" hole installed in the lower corners of the inside door pans for drainage. The doors shall have a closed cell neoprene rubber gasket installed around the perimeter of the door to remove water. Exterior door latches shall incorporate a polished D-paddle handle with rotary style latch. For ease of operation, the D-handle opening shall be large enough to accommodate a gloved hand. The D-paddle latching design shall be subjected to corrosion, water infiltration, and cycle testing to 35,000 cycles. Double doors shall utilize concealed rotary latches on the secondary door, actuated by a recessed stainless steel paddle handle. The door design shall not impede into the compartment opening when in the open position. The watertight door seal shall exceed the current KKK-1822 water infiltration standards. The doors shall be securely fastened to the apparatus body with full length stainless steel piano hinges using ¼" stainless bolts and locking nuts, minimum 20. The hinges shall be slotted to allow for adjustments. Absolutely no self-tapping screws or pop rivets shall be acceptable to mount the door mechanisms or slam latch assemblies.

COMPARTMENTS, RIGHT SIDE

All compartments shall be built to provide the largest cubic feet of storage space as possible.

R1 - There shall be one high side compartment over the front outriggers. This compartment shall have one horizontally hinged lift up style door.

R2 - There shall be one compartment forward of the rear wheels. This compartment shall have one vertically hinged door.

R3 - There shall be one high side compartment over the rear wheel. This compartment shall have one horizontally hinged lift up style door.

R4 - There shall be one compartment ahead of the rear outrigger. This compartment shall have one vertically hinged door.

R5 - There shall be one compartment behind the rear outrigger. This compartment shall have two vertically hinged doors.

HOSE BED, EZ STACK RIGHT SIDE

The aerial apparatus body shall be equipped with an "E-Z Stack" hose bed on the right side the apparatus body to allow for easy removal of fire hose. The hose shall stack above the low side compartments. The interior hosebed side shall be constructed of .1875" 5052 H-32 smooth aluminum plates welded to the extruded framework. There shall be a 3" x 3½" 6063 T6 aluminum extrusion with .190" wall thickness running the entire length of the interior hosebed at the top for structural rigidity. The exterior hosebed side shall be constructed from 2" x 4" .190" wall thickness extrusions. The extrusions shall be made from 6063 T6 aluminum alloy and have .190" outside radius corners. In order to protect the body appearance, the exterior hosebed sides shall be of a double thickness of 3/16" aluminum plate, 5052 H-32 aluminum alloy. The plates shall be welded to the extruded aluminum framework, with the exterior panel being continuously welded. The continuous weld process shall be completed in such a manner so as to not warp or deform the body sides. The hosebed decking shall be entirely constructed from anodized aluminum extrusions. The extrusions shall be ¾" x 8.125" and have ½" x 3" flat bar welded to the underside to form a one-piece grid. Absolutely no pop rivet or other types of fasteners shall be acceptable on the hosebed floor. The entire hosebed shall be removable in one piece to allow

ease of maintenance to the tank. The hosebed shall include an extrusion across the front and rear of the compartment to allow the installation of adjustable hosebed dividers. For the safety of firefighters working on the apparatus, the hosebed must be completely open across the top, from front to rear. The floor shall be in a single plane (completely flat) and the top shall be completely open when the hosebed cover is opened. Other than adjustable hosebed dividers, no obstructions shall be allowed in the hose bed. The finished hosebed shall accommodate either an ISO or NFPA compliant hose load. The hosebed shall have a rear opening of 21" wide x 18" high. LED light strips shall be provided across the length of the hosebed. The lights shall be waterproof up to one meter (3.3 feet). The lights shall be wired to the work light switch in the cab.

COMPARTMENT DOORS, RIGHT SIDE HINGED

The specified right side compartment doors shall be constructed entirely from 5052-H32 smooth aluminum plate using a box pan configuration. The outer panel shall be constructed from 3/16" smooth aluminum plate and the inner pan stitch welded in place from 1/8" smooth aluminum plate. There shall be a ¼" hole installed in the lower corners of the inside door pans for drainage. The doors shall have a closed cell neoprene rubber gasket installed around the perimeter of the door to remove water. Exterior door latches shall incorporate a polished D-paddle handle with rotary style latch. For ease of operation, the D-handle opening shall be large enough to accommodate a gloved hand. The D-paddle latching design shall be subjected to corrosion, water infiltration, and cycle testing to 35,000 cycles. Double doors shall utilize concealed rotary latches on the secondary door, actuated by a recessed stainless steel paddle handle. The door design shall not impede into the compartment opening when in the open position. The watertight door seal shall exceed the current KKK-1822 water infiltration standards. The doors shall be securely fastened to the apparatus body with full-length stainless steel piano hinges using ¼" stainless bolts and locking nuts, 20 minimum. The hinges shall be slotted to allow for adjustments. Absolutely no self-tapping screws or pop rivets shall be acceptable to mount the door mechanisms or slam latch assemblies.

HANDRAILS, AERIAL ACCESS

There shall be a pair of handrails manufactured from 1¼" diameter knurled aluminum tubing installed on the apparatus. One handrail shall be 30" inches in length with chrome plated end stanchions. One rear aerial egress handrail be of "pool" style design and terminate atop the rear of the aerial body to provide maximum firefighter safety. The handrails shall be mounted vertically at the rear of the aerial body to facilitate access to the aerial turntable. The handrails shall be painted in a black ruggedized material.

TURNTABLE ACCESS, LEFT REAR SWING OUT

There shall be a swing out ground-to-turntable access ladder provided at the left rear of the body. The ladder shall be constructed from aluminum plate and five heavy-duty cast aluminum steps. To assure a safe climbing angle, the uppermost portion of the ladder shall be immediately adjacent to the upper fire body, while the lowest step on the ladder shall be approximately 14" from the edge of the body. The steps shall each measure a minimum of 16" wide x 6" deep and placed on approximate 13" centers. Steps shall be open grip type with a raised, slip-resistant surface, exceeding the requirements of NFPA 1901, 15.7.4. The steps shall be attached to side rails constructed of minimum ½" thick x 3" wide aluminum plate, creating a sturdy, long lasting structure. All step surfaces shall comply with NFPA 1901. There shall be two Whelen PELCC LED strip lights to light the step areas. The LED lights shall have a polished bezel. The lights shall activate with the work light switch.

COMPARTMENT, LADDER STORAGE

A single ladder storage module shall be provided beneath the aerial device. To avoid confusion of ground ladder locations and to provide simpler fire ground operations, proposals that include

more than one rear ladder storage module shall not be accepted. The ladder module shall have interior measurements not less than 44” wide x 26” high and have storage capacity for the specified ladders, with access to the ladders via an opening at the rear. The contents of the ladder tunnel shall be held in place so as not to contact the entry door. The ladders shall be separated by dividers and held in place. All ladders can be removed individually without having to remove other ladders. The ladders shall slide on thin poly-carbonate sheet material. A roll-up door shall be installed on the rear ladder compartment. Slats are 1" double-wall (box frame) aluminum extrusion. Exterior surfaces are to be flat. Interior surfaces are to be concave to prevent loose equipment from jamming doors. The slats must be anodized to eliminate oxidation. The slats are to have inner-locking end shoes on every slat secured by a Punch-Dimple process. The slats are to have interlocking joints with a folding locking flange. Between each slat shall be a PVC/vinyl inner seal to prevent any metal-to-metal contact. The track shall be one-piece aluminum, which has an attaching flange and finishing flange incorporated into its design, which provides a finish look to installation without additional trim or caulking. The track is to have a replaceable side seal. The side seal shall prevent water and dust intrusion into the compartment. There shall be an aluminum drip rail above each compartment door with a built in replaceable wiper seal. Each roll up door shall have a counter balance to assist in lifting and eliminate the risk of accidental closing. A full width lift bar, operable by one hand, shall be used as a positive latch device for securing each individual compartment door in the closed position. The outside door shall have a natural finish. There shall be an anodized aluminum sill plate installed over the compartment door. Ladder storage shall be compliant with ISO on supplemental ladders.

STORAGE TUBES, PIKE POLE/NEW YORK HOOK

Twelve (12) aluminum tubes shall be installed on the apparatus for pike pole and New York Hook storage. One end shall be notched to allow the poles to be locked in place.

STORAGE SLOT, BACKBOARD

There shall be one slot with the capacity to hold one long style backboard installed as specified by the fire department. The department must supply make and model of backboard.

COVER PLATES, OUTRIGGERS

Cover plates shall be provided over each outrigger location. The plates shall be painted with a black ruggedized material. The outrigger covers shall be a maximum of 15" wide to allow the deployment of the outrigger between parked cars.

VERTICAL LOAD TEST, APPARATUS BODY

The fire body shall exceed a vertical load testing. The vertical load test to the fire body shall follow the same strict and detailed requirements of the Economic Commission for Europe Structural Standard, ECE-29R as applied to the cab. The fire body shall be placed under a vertical load test to show structural integrity. There shall be 65,979 pounds applied to the fire body. There shall be no structure failures to the body and body compartments. A complete photographic, video, data, and dimensional record of these tests shall be available and placed on record for customer evaluations.

WHEEL WELL AIR BOTTLE COMPARTMENT, LEFT FRONT

There shall be DUAL aluminum air bottle compartments located in the left front body wheel well. Each compartment shall house two spare SCBA cylinders. The floor and sides of the compartments shall be lined with a polypropylene sheet and the back wall shall be lined with rubber matting to provide scuff protection. The bottom of the compartments shall be supported to eliminate breakage. The compartments shall be vented to facilitate moisture drainage.

WHEEL WELL AIR BOTTLE COMPARTMENT, LEFT CENTER
There shall be DUAL aluminum air bottle compartments located in the left center body wheel well. Each compartment shall house two spare SCBA cylinders. The floor and sides of the compartments shall be lined with a polypropylene sheet and the back wall shall be lined with rubber matting to provide scuff protection. The bottom of the compartments shall be supported to eliminate breakage. The compartments shall be vented to facilitate moisture drainage.

WHEEL AIR BOTTLE COMPARTMENT, LEFT REAR
There shall be DUAL aluminum air bottle compartments located in the left rear body wheel well. Each compartment shall house two spare SCBA cylinders. The floor and sides of the compartments shall be lined with a polypropylene sheet and the back wall shall be lined with rubber matting to provide scuff protection. The bottom of the compartments shall be supported to eliminate breakage. The compartments shall be vented to facilitate moisture drainage.

WHEEL WELL EXTINGUISHER COMPARTMENT, RIGHT FRONT
There shall be an aluminum extinguisher compartment located in the right front body wheel well to house two extinguishers 2½" water and 20 pound ABC. The floor and sides of the compartment shall be lined with a polypropylene sheet and the back wall shall be lined with rubber matting to provide scuff protection. The bottom of the compartment shall be supported to eliminate breakage. The compartment shall be vented to facilitate moisture drainage.

WHEEL WELL AIR BOTTLE COMPARTMENT, RIGHT CENTER
There shall be DUAL aluminum air bottle compartments located in the right center body wheel well. Each compartment shall house two spare SCBA cylinders. The floor and sides of the compartments shall be lined with a polypropylene sheet and the back wall shall be lined with rubber matting to provide scuff protection. The bottom of the compartments shall be supported to eliminate breakage. The compartments shall be vented to facilitate moisture drainage.

WHEEL WELL EXTINGUISHER COMPARTMENT, RIGHT REAR
There shall be an aluminum extinguisher compartment located in the right rear body wheel well left rear to house one 15 pound CO2 extinguisher. The floor and sides of the compartment shall be lined with a polypropylene sheet and the back wall shall be lined with rubber matting to provide scuff protection. The bottom of the compartment shall be supported to eliminate breakage. The compartment shall be vented to facilitate moisture drainage.

BODY TRIM
The standard body trim shall include the following characteristics. There shall be drip rail installed over the compartment door openings. The vertical rear face of the body shall be covered with smooth aluminum plate. This plate shall be painted with a black ruggedized material.

FUEL FILL, RECESSED WITH DOOR
There shall be a recessed fuel fill assembly with a non-locking door mounted on the left side of the apparatus body. The fuel fill assembly shall be equipped with a fuel fill cap, retention ring and hinged door. The assembly shall be properly labeled "DIESEL FUEL ONLY". The door shall be painted with a black ruggedized material.

MUD FLAPS, REAR
The rear axle mud flaps shall be constructed from hard black rubber and installed at the rear of the body fenders.

RUBRAIL
There shall be an aluminum rubrail installed on both sides of the lower body compartments. The rubrail shall be constructed from "C" channel extrusion. The aluminum rubrail shall be bolted in place with stainless steel bolts, and spaced from the fire body to provide body protection. The solid rubrail shall serve as protection to the side doors when encountering close objects. Tread plate rubrails or welded on shall not be acceptable. The rubrail shall be painted black with a ruggedized material.

FOLDING STEP, FRONT OF BODY
There shall be six large folding steps with a minimum surface area of 35 square inches. The steps shall be mounted on the front face of the forward compartment as directed by the customer. There shall be an LED light installed above and below each step. The steps shall be painted with a black ruggedized material.

TOW EYES, REAR
Two 1" thick rear tow eyes constructed of A-36 steel shall be mounted below the frame at the rear of the vehicle. The tow eyes shall be attached to steel weldments that are mounted to the apparatus. The eyes shall have a minimum dimension of 3”diameter. The tow eyes shall be used for towing, not lifting the vehicle.

HANDRAIL, FRONT OF BODY
There shall be one 1¼" knurled stainless steel handrail installed on the front face of the compartments. It shall be approximately 12" in length. The handrail shall be painted with a black ruggedized material.

HOSE BED DIVIDER
One hose bed divider shall be manufactured from ¼" smooth aluminum plate with an extruded aluminum base welded to the bottom. The divider shall have an extruded track to slide in to allow the hose bed to adjust for different hose capacities. One end of the divider shall have a 3" radius corner. The divider shall be sanded to prevent damage to hose.

HOSE BED COVER
A hose bed cover constructed of 16 oz. heavy-duty Hypalon shall be provided. Cover shall be fire retardant and installed over hose bed. The cover shall have chrome twist-locks and Velcro installed around the perimeter of the hose bed. The end of the hose bed cover shall be secured and cover the hose bed opening. The cover shall completely protect the hose in the hose bed and prevent hose from inadvertently deploying during normal operation. A safety sign FAMA22, which warns of the need to secure hose, shall be visible to personnel at the hose storage area. The end flaps shall be secured using footman loops. The cover shall completely protect the hose and prevent the hose from inadvertently deploying during normal operation. The cover shall meet the TIA 03-1 NFPA requirement. The cover shall be black in color.

HOSE BED CAPACITY
The hose bed shall have the capacity to be compliant with NFPA 1901 and shall be determined at pre-construction meeting

SHELVES, ADJUSTABLE
There shall be five adjustable shelves constructed from 3/16" smooth aluminum. The shelf shall be approximately 37-48" wide x 24-28" deep. The adjustable track shall be made from aluminum extrusions. Each shelf shall have a 2" lip on all sides for additional strength.

TRAYS, 500 POUND ROLL OUT
There shall be two roll out trays supplied, constructed from 3/16" smooth aluminum plate. The trays shall be approximately 37-48" wide x 45" deep. The trays shall have a 3" lip on all sides for additional strength. The trays shall be mounted on **Grant slides** with a combined capacity of 500 pounds.

TRAYS, 500 POUND ROLL OUT
There shall be two roll-out trays supplied, constructed from 3/16" smooth aluminum plate. The trays shall be approximately 37-48" wide x 24-28" deep. The trays shall have a 3" lip on all sides for additional strength. The trays shall be mounted on **Slide Master slides** with a combined capacity of 500 pounds.

TRAYS, 30° ROLL-OUT/TILT
There shall be three roll-out trays supplied, constructed from 3/16" smooth aluminum plate. The tray shall be approximately 37-48" wide x 24-28" deep. The trays shall have a 3" lip on all sides for additional strength. The trays shall be mounted on Slide Master Slides with a combined capacity of 250 pounds. The trays and the rail system shall be designed to tilt 30° with 70% extension. The trays shall be mounted in a compartment specified by the department.

TOOL BOARD, VERTICAL ROLL OUT
There shall be one vertical tool board mounted in a specified compartment. Each tool board shall be manufactured from 3/16" smooth aluminum plate. The tool board shall be approximately 24-28" deep x full height and designed to extend 100% of the slide length. One set of Grant 250 pound slides shall be installed per tool board.

TOOL BOARD, HINGED ALUMINUM
One 3/16” thick aluminum tool board shall be installed in the specified compartment for the mounting of additional equipment. The board shall be welded to a 2” x 2” perimeter mounted aluminum extrusion for strength to form a hinged tool board. The tool board shall be secured to a stainless steel piano style hinge bolted to a reinforcing extrusion welded to the front wall of the compartment left side. The resulting hinge mounting shall space the tool board away from the compartment wall sufficiently so that tools may be mounted on both sides of the board. The door shall be held in the open position by a gas shock. The door shall be held in the closed position by a non-locking lever latch with two point catch.

COMPARTMENT DIVIDER
One compartment divider shall be mounted in the specified compartment. The divider shall be constructed of 3/16" smooth aluminum plate.

COMPARTMENT FLOORING, TURTLE TILE
There shall be Turtle Tile installed on the compartment floors. The color of the tile shall be black. The Turtle Tile shall be completely removable for cleaning. If the compartment has a roll out tray mounted directly on the floor, the Turtle Tile will be mounted in the tray.

HEAVY-DUTY REAR MOUNT LADDER
It is the responsibility of each bidder to provide the purchaser, as part of the bid evaluation, evidence the aerial device being bid is engineered, designed, and manufactured for heavy-duty, continuous use in the extreme type of environments found within the fire service. Each section of the specifications must have a written response from the bidder. No exception. Each aerial apparatus shall be manufactured in strict compliance with all applicable requirements as set forth in the current edition of NFPA (National Fire Protection Agency) 1901. Firefighter safety, ease of maintenance and product reliability shall all be of paramount importance during the design and

build phase of the aerial ladder apparatus. The ladder shall be comprised of at least four sections extending to a minimum height of 105' at 72°, measured in a vertical plane from the top rung of the fly section to the ground, per NFPA 1901, 19.2.2 and 19.2.4. The aerial device shall be designed and tested with a safety factor of at least 2:1 as required by NFPA 1901 using the following terms and formula, with the waterway flowing capacity:

NFPA SAFETY FACTOR AND RATED CAPACITIES

The methodology, definitions, testing, and criteria used by the aerial manufacturer to determine the preceding and following Safety Factor and Rated Capacity of the aerial device shall be in strict compliance with the definitions of such, as found in current edition of NFPA 1901 and these specifications.

RATED CAPACITIES AND SAFETY FACTORS

The aerial manufacturer shall use predetermined methodology, definitions, testing, and criteria to determine the rated capacity and safety factor of the aerial ladder. The rated capacity and safety factors shall be in strict compliance with the definitions found in NFPA 1901, 19.2 thru 19.6 and 19.17 thru 19.25. All rated capacities and safety factors shall be verified by a nationally recognized, independent third party testing company, with the results provided to the purchaser at the time of delivery. The purchaser desires to purchase with these specifications, a 105' aerial device with a minimum safety factor of at least 2:1 as required and defined by NFPA 1901. Therefore, the aerial manufacturer shall hereby certify, by submitting a bid for these specifications that the aerial device meets or exceeds the following requirements. The design stress or primary stress within all structural load-supporting members of the aerial device shall not exceed 50% of the minimum as welded yield strength of the material based on the combination of the dead load of the aerial plus the rated capacity of 750 pounds at the tip of a 105' aerial while flowing 1500 GPM, at a 90° angle to ladder centerline OR the dead load of the aerial plus the rated capacity of 750 pounds at the tip with the waterway uncharged. With the structural load supporting members of the aerial device at either: an ambient temperature of 70°F; OR an elevated temperature of 350° F; thereby exhibiting a safety factor of at least 2:1 in all feasible operational conditions. These capabilities shall be valid and true when the apparatus is deployed in the unsupported configuration, based upon 360° rotation, up to full extension, and at any degree of elevation (-6° to +72°) that the aerial can achieve.

SERVICE LIFE OF AERIAL LADDER SAFETY FACTOR

The purchaser desires to purchase with these specifications, an aerial device with a safety factor that remains NFPA compliant and constant throughout the life of the aerial device. The Safety Factor of every structural load-bearing member in the aerial device shall remain above 2:1 for a "Safety Factor Service Life" of up to a minimum of 20 years.

REAR MOUNT AERIAL LADDER

The aerial ladder shall be of the rear mount design with the turntable mounted at the rear of the apparatus. The ladder tip shall be over the cab of the apparatus when in the stowed position.

OPERATIONAL ENVELOPE AND REACH

The aerial ladder shall have minimum of an operational range of -6° to +72° elevation. The ladder shall have the ability to rotate a minimum 180° in the -6° position. The aerial ladder shall be comprised of four sections extending to a height of 105' at 72°, measured in a vertical plane from the top rung of the fly section to the ground, per NFPA 1901, 19.2.2 and 19.2.4. A minimum horizontal reach of 94.6' shall be measured from the turntable center point to the outermost rung on the outermost fly section, with the aerial at full extension and at 0° elevation, per NFPA 1901, 19.2.3 and 19.2.4.

STRUCTURAL MATERIAL

The primary load support members of the aerial ladder, i.e., handrails, base cords and vertical trusses, shall be constructed of certified minimum 100,000 PSI yield strength steel or aluminum.

RUNG COVERS, SERRATED RUBBER

Each aerial ladder rung shall be covered with secure, heavy-duty, deep serrated rubber sheathing. Attachment of the sheathing to the rung shall be by a combination of non-invasive mechanical fastener and an adhesive application. Under no circumstance shall the covers turn when a rung is at ambient temperature (75°F) or at an elevated temperature (350°F). In the interest of firefighter safety, there shall be no exception to this requirement. The mechanical fastener shall in no way penetrate or encounter any portion of the ladder rung. The sheathing shall be easily replaceable if the rubber becomes worn, however the rung covers shall be designed, constructed, and installed with lifetime service as the objective.

EGRESS, BOLT-ON

A bolt on removable egress shall be installed on the tip of the fly section. Only certified structural fasteners shall be utilized to attach the egress to the tip of the fly section. Additionally, the fasteners shall be stainless steel. This design shall allow for easy replacement should the egress become damaged during rescue operations. This shall prevent the department from experiencing serious downtime, as is common with welded on egresses. For this reason, a design that allows the egress to be welded to the fly section shall not be acceptable. Additionally, the egress shall have handrails that match the fly section handrails for an unnoticeable transition between the two. When the ladder is at 0° elevation, the egress section shall be on a plane of minus 11°. This shall provide a smoother transition onto the ladder from the tip, when it is at a high angle elevation. The egress shall have handrails that match the fly section handrails for an unnoticeable transition between the two. The rung on the egress shall be held to the same design load criteria as the rungs of the aerial ladder sections. This shall mean that each egress rung shall be able to support a design load of 500 pounds minimum, distributed across the rung, as specified in NFPA 1901, 19.2.2 and 19.3.1. Because of the obvious fire ground advantages of the bolt-on egress section, as well as the reduced replacements costs associated with damage, no exceptions shall be allowed to the bolt-on egress requirement. The color of the bolt-on egress shall be bright yellow.

FOLDING STEPS, FLY SECTION

One set of folding steps shall be installed at the tip of the ladder to provide solid footing for personnel while operating the elevated master stream device. In the interest of fire fighter safety, the step surfaces shall be from Morton Cast material and be significantly oversized, with each step measuring approximately 6" x 13". In order to meet NFPA 19.5.4(4), a kick plate constructed of Morton Cast, approximately 2" x 6", shall be provided with each step. When folded out of the way, the steps shall not present any obstruction to climbers on the apparatus. Proper installation of the steps shall require that rubber gaskets be installed under the mounting surface where the step is secured to the aerial ladder section with certified structural fasteners.

LOAD LIFTING / RAPPELLING EYES, AERIAL FLY SECTION

The aerial ladder should be equipped with two load lifting / rappelling eyes at the tip of the fly section. The load lifting/rappelling eyes, as a pair, shall be rated at 500 pounds.

EXTENSION INDICATOR

There shall be numerals affixed to the inside of the handrail of the base section, opposite the turntable control console. The numerals shall be at appropriate intervals, indicating total aerial extension in five feet increments. A band on the first fly section shall align with these marks at the appropriate extension distance. The extension indicator color shall provide a high contrast

with the color of the ladder section to which it is applied. This shall make the length of aerial extension easily readable by the operator by merely glancing at the indicators. Numerals indicating length of extension shall be placed adjacent to indicating bands.

ANGLE INDICATOR, LIGHTED

There shall be a liquid filled angle indicator mounted on the base section of the aerial ladder. The indicator shall give accurate elevation in degrees from -20° to +80° in relation to level. The liquid shall be of proper viscosity and composition to stay in liquid form even when exposed to below zero temperatures. Reading of the indicator shall be accomplished by observing the position of a suspended ball in relation to the degrees of elevation as marked on the indicator housing. The indicator shall be lighted for nighttime operations.

SIGN PLATES, LADDER

There shall be two sign plates provided on either side of the aerial base section. The sign plates shall measure approximately 16" tall x 133" long constructed from 1/8" smooth aluminum plate. The sign plates shall be painted black to match top of cab.

TORQUE BOX

A torque box subframe shall be installed on the chassis frame rails, integral with the stabilizers. The torque box subframe assembly shall be capable of withstanding all torsion and horizontal loads when the unit is on the stabilizers.

LADDER TRAVEL SUPPORT, HEAVY-DUTY

A heavy duty ladder rest with poly pads shall be provided for support of the ladder in the travel position. The location of the travel support shall be directly behind the chassis cab. The travel support shall be fabricated from heavy-duty steel tubing. The travel support shall be designed to be easily removable to allow for ease of maintenance and repair when necessary. The base section of the ladder shall contain stainless steel scuff plates shall where the ladder comes into contact with the ladder support. An indicator light shall be provided on the turntable to indicate when the ladder is aligned with the travel support and may be lowered into it. The ladder rest shall be illuminated for night time operation. The illumination light shall automatically turn on with the aerial master switch.

HYDRAULIC SYSTEM

The tubing and hoses used in the hydraulic system shall have a high pressure rating, with the tubing having a minimum burst pressure of 9,600 to 17,400 PSI and the hoses being a minimum of 8,000 to 13,000. The hydraulic oil reservoir shall be the low profile type, and have an approximate capacity of 45 gallons. A dipstick shall be provided to check the oil level. The oil fill shall be furnished with a cap that shall act as a ventilator provide clean fresh air into the oil tank and a 40 micron filter to provide positive protection from contaminates. A magnetic drain plug shall be provided in a low point of the oil tank. An easily accessible three micron replaceable oil filter shall be installed on the hydraulic oil tank. The hydraulic oil tank shall be furnished with two pick-up tubes, one tube being used for normal operation and the other for emergency operation. The emergency pick-up tube shall extend further down into the oil tank to provide for some reserve oil in case a hydraulic line is broken. The hydraulic system shall be protected from possible hydraulic pump malfunctions by a relief valve which shall route the excess oil into the oil tank when the pressure in the hydraulic system exceeds 3,500 PSI. The hydraulic control valves shall also be protected by being plumbed to a pressure relief valve to protect them from high pressure. The hydraulic tank shall be mounted in the center portion of the ladder travel support in order to maximize useable space in the pump compartment.

PUMP, POWER TAKE-OFF

The apparatus shall be equipped with a power take off (PTO) driven by the chassis transmission and actuated by an electric shift, located inside the cab. The PTO, which drives the hydraulic pump, shall meet all the requirements for the aerial unit operations. Installed on the cabs instrument panel shall be an amber light notifying the operator that the PTO is engaged. The aerial PTO rocker switch shall engage the PTO, and drive the aerial hydraulic pump and the generator hydraulic pump (if applicable).

HYDRAULIC PUMP

A pressure compensated, load sensing, variable gallonage type pump shall be used to supply the aerial hydraulic system. There shall be sufficient capacity to pump proper volume and pressure of hydraulic fluid in order that all ladder functions may operate at once without a noticeable loss of speed. Because it is has a load sensing design, it shall pump aerial hydraulic oil only when the ladder or platform is in motion, thereby preventing overheating of the hydraulic oil, in compliance with NFPA 1901, 19.19.6 and 19.19.7. An interlock shall be provided to allow the PTO to be shifted only after the chassis parking brake has been set and the chassis transmission has been placed either in the neutral position or in the drive position if the driveline has been disengaged from the rear axle. The aerial master power switch shall be interlocked, allowing operation of the aerial device only after the chassis spring brake has been set, and the chassis transmission has been placed either in the neutral position or in the drive position if the driveline has been disengaged from the rear axle. An amber indicator light shall be integrated into the chassis PTO switch installed on the cab instrument panel to notify the operator that the PTO is engaged. The indicator light shall only illuminate after the PTO has obtained fluid pressure. The PTO must also use the Allison Transmission PTO logic for proper operation and limit controls.

HYDRAULIC PRESSURE GAUGES

Hydraulic pressure gauges shall be provided at the ground level control station and at the turntable control station. The gauges shall be liquid filled type. The liquid shall not be vulnerable to freezing in subzero temperatures. The lower control station gauge shall read pressure constantly. The turntable control stations gauge shall read pressure whenever the system lock is disengaged and the aerial controls are active.

SERVICE VALVES, HYDRAULIC SYSTEM

There shall be ¼ turn ball valves installed in the hydraulic lines to isolate the hydraulic filters from the hydraulic system. This shall minimize the hydraulic fluid loss when changing pressure filter elements during routine maintenance.

PUMP, EMERGENCY

The apparatus shall be equipped with one emergency hydraulic pump electrically driven from the chassis battery system. The emergency pump shall be capable of providing adequate ladder functions to stow the unit in case of main hydraulic pump failure. Two control switches for this emergency pump shall be provided. One switch shall be installed at each one of the following two control stations: Turntable Control Console and Stabilizer Control Station. Each control switch shall be a spring-loaded momentary switch. A red indicator light shall be mounted adjacent to each switch to indicate activation of the emergency pump.

SWIVEL, HYDRAULIC

A hydraulic swivel shall be provided on the aerial to connect the hydraulic lines from beneath to above the point of aerial rotation. The hydraulic swivel shall allow for 360° continuous rotation of the aerial ladder with no loss of speed or capacity in its functions.

SWIVEL, ELECTRICAL

An electrical swivel shall be provided on the aerial to connect the electrical wiring from beneath to above the point of aerial rotation. The electrical swivel shall allow for 360° continuous rotation of the aerial ladder with no loss of speed or capacity in its functions. A minimum of 32 collector rings shall be provided for adequate electrical power to the aerial device.

ELEVATION SYSTEM

Two double acting lift cylinders shall be utilized to provide smooth precise elevation from a minimum of 6° below horizontal to 72° above horizontal. The lift cylinders shall have a 6" internal diameter (bore) and a 2½" solid cylinder rod. The lift cylinders shall be equipped with integral holding valves located on the cylinder to prevent the unit from lowering should the charged lines be severed at any point within the hydraulic system. The lowering of the ladder shall be controlled by a pressure-limiting valve limiting the downward pull of the ladder when it is bedded. Both raising and lowering functions shall be influenced by flow compensation, which shall maintain ladder tip speed within the design speed regardless of load, angle, or extension. Ladder tip speed shall be decelerated above 65° in order to reduce tip-lash. Ladder lowering shall be controlled on the down motion to prevent the cylinders from completely retracting, thus allowing a cushion of oil for continuous ladder load readout. Elevation cylinder upper and lower pivot pins shall be installed with a means provided to keep the pins in place. The design shall not inhibit the pins from being removed by a trained mechanic.

EXTENSION/RETRACTION SYSTEM

A full hydraulic powered extension and retraction system shall be provided using two sets of Siamese hydraulic cylinders and cables. This extension system provides a total of four cylinders and, between sections one and two, and four cables. The remaining sections shall have two cables each. Aerial ladder designs utilizing only one cable per section shall not be considered. For added safety, each set of cylinders and cables shall be capable of operating the ladder in the event of a failure of the other. The extension cylinders shall each have a 3½" internal diameter (bore) and a 1½" diameter solid rod. Extension and retraction of the telescopic sections shall be internally limited within the cylinders, eliminating excess strain on the cables, sheaves, and ladder structure. Each of the cylinder, cable, and sheave assemblies shall be completely independent of the other, so as provide a safety factor wherein a failure of one assembly shall not affect the function and operation of the other. The extension cylinders shall be equipped with counter balance holding valves to synchronize the cylinders for smoother operation and prevent the unit from retracting should the charged lines be severed at any point within the hydraulic system. The reeling of the cable shall be such as to provide synchronized, simultaneous movement of all sections from full extension to full retraction. All pulleys and sheaves shall be enclosed as an added safety feature as well as to prevent personnel on the ladder from becoming entangled in them, in compliance with NFPA 1901, 19.18.4. **{No Exceptions}**

AERIAL CABLE DIAMETERS

The extension/retraction cables shall be as follows:

- Base to lower mid-section: .50" diameter
- Lower mid- to upper mid-section: .38" diameter
- Upper mid- to upper section: .31" diameter

All cables shall have a minimum 8:1 safety factor, exceeding the requirement of NFPA 1901, 19.20.3. **{No Exceptions}**

CERTIFIED CABLE SWAGED SHACKLES

All swaged shackles ends shall have a certification test from the manufacturer of the assembly.

PULLEY SYSTEM
The extension and retraction pulley system shall be greaseable.

SLIDE PADS, OUTRIGGER AND LADDER
Nylon wear pads impregnated with molybdenum disulfide and high in molecular weight shall be used between the telescoping sections for maximum weight distribution, strength, and smoothness of operation. This impregnation shall provide a lubricating function. Stainless steel adjustment screws shall be provided on the wear pads to permit proper side tension. Plates shall be installed on the side of the slide pads where adjustment screws encounter them. No exceptions shall be allowed to this requirement to keep the adjustment screws from embedding themselves into the pads, which may cause the pad to crack and fail.

ROTATION GEAR, HEAVY DUTY
A 44" diameter external tooth, swing circle bearing should be used for the rotation system. The bearing shall provide 360° continuous rotation. The bearing shall be designed specifically for the aerial device in place of the aerial device being designed to accommodate a particular bearing. The turntable shall be bolted to the bearing using 30 SAE grade 8 (0.625") diameter bolts. The bearing shall be bolted to the base support structure with 30 SAE grade 8 (0.625") diameter bolts. Welding on the bearing in any manner shall not be acceptable. The turntable base and the torque box bearing plate surfaces that contact the bearing shall be machined to prevent loading the bearing when the attaching bolts are brought to full torque. Machining of the surfaces shall be done after all welding to assure no further distortion of the material. Shims shall not be acceptable as they shall reduce the surface contact area significantly thereby causing a concentration of forces at the shims.

BOLT TORQUING FROM TOP SIDE
All rotation bearing bolts shall be able to be torque from the top side of the turntable without the bolt or nut being held under the turntable by a person. This shall require a design that shall stop all chance of the bolt "spinning" while torque is being applied to the fastener. Application of Loctite or a similar compound alone, without any other means provided to hold the fastener; shall not be acceptable. Additionally, this design feature shall not incorporate drilling, bending, welding on, or in any way; modifying the structural fastener, nut, or washers.

ROTATION GEAR REDUCTION BOX
A hydraulically driven planetary gearbox with a drive speed reducer shall be used to provide infinite and minute rotation control throughout the entire rotational travel. The rotation gear reduction box shall be installed on the top side of the turntable so that it is easily accessible, yet shall be installed so as not to provide an obstruction or tripping hazard to persons on the turntable. Specifically, it shall be installed toward the front of the turntable, under the aerial ladder base section. Under no circumstance shall the gearbox present any interference with the aerial device, even at low elevations. A spring applied, hydraulically released, disc type "swing brake" shall be furnished to provide positive braking of the turntable assembly. Provisions shall be made for manual operation of the rotation system should complete loss of hydraulic power occur. These provisions shall include a hand crank supplied with the unit. The hydraulic system shall be equipped with pressure relief valves, which shall limit the rotational torque to a nondestructive power. All moving parts of the rotation gear reduction box shall be enclosed or under the turntable decking so that no safety hazards are present.

MAINTENANCE TOOLS
Some tools required for periodic maintenance of the aerial device shall be provided with the apparatus at the time of delivery. These tools shall be as follows:

- One ½" drive, torque wrench

- One ½" drive, 15/16" socket
- One combination ½" x 9/16" box end wrench
- One set of Allen wrenches (5/64", 3/32", 1/8", 5/32", 3/16", 7/32", ¼")

MANUAL ROTATION HAND CRANK

One manual rotation hand crank shall be provided as a means to rotate the turntable in the unlikely event of power loss. This hand crank shall be provided as standard equipment.

STABILIZERS, FRONT/REAR

The body shall be designed to accommodate a four stabilizer system. The openings shall be framed in aluminum extrusions. A stabilizer cover made from treadplate shall be supplied on the extendable stabilizer. The cover shall provide a pleasing appearance and mounting location for a red stabilizer warning light as outlined in NFPA 1901. The stabilizer openings shall be supplied with clear lights to illuminate the stabilizers and the ground surrounding the openings. The lights shall illuminate when any stabilizer is moved from the stored position. The stabilizers shall be an integral part of the torque box. The stabilizers shall be connected to the hazard light circuit to warn the driver if they are not stowed when the parking brake is released. The treadplate covers shall be painted in a black ruggedized material.

PADS, AUXILIARY STABILIZER

Four auxiliary pads shall be provided for load distribution for each stabilizer. The pads shall be 24" x 24" x 7/8" thick. These pads shall be constructed of lightweight high capacity cast nylon material with a load capacity on hard foundation of 150,000 pounds. These auxiliary pads shall meet all FEA testing criteria and retain shape after use, regardless of surface setup. Each pad shall be equipped with a center mounted heavy duty rope handle for ease of placement and pick up. Each pad shall be mounted in a 3/16" smooth plate aluminum rack, with two pads located each side of the apparatus below the compartment immediately behind the outrigger. Installation of the bracket shall not interfere with the vehicle's angle of departure. The aluminum plate storage racks shall be equipped with a proximity switch, connected to the door ajar circuit, to alert the driver in case the outrigger pads are not properly stowed.

LOCKS, MECHANICAL STABILIZER

The vertical portion of each outrigger cylinder shall be equipped with a mechanical pin, designed to lock the outrigger in the working position. The pin shall be zinc plated and shall have a yellow dipped vinyl handle for increased visibility. The locking system shall be incorporated into the outriggers outer protective cover, preventing damage to the cylinder rod. The inner jack tube and outer protective covering shall be double thickness in the pinning area for additional strength. All makes and brands of holding valves inherently pass fluid and any seal within the cylinder may develop a leak. Therefore, in the interest of firefighter safety, mechanical stabilizer locks shall be supplied at each outrigger, in addition to holding valves. There shall be no exception to this requirement.

OUTRIGGER ASSEMBLIES, GALVANIZED

The extending stabilizer beams, inner jack tubes, and stabilizer pads shall be wheel-o-braided to remove any mill scale, or contamination prior to galvanizing. Following this preparation, the individual components shall be hot dip galvanized. The galvanizing process shall require that the entire assembly be completely submerged. Following the galvanizing process, the surface shall be ground smooth to remove dross. This preparation shall provide maximum protection for these critical components. No exceptions shall be allowed to this requirement due to stabilizers being exposed to salt spray and road debris.

WEAR PADS/BEARING SURFACES

Nylon wear pads impregnated with molybdenum disulfide and high in molecular weight shall be used between the stabilizer housing assembly and the extension tube for maximum smoothness of operation. Two Nylatron wear pads shall be installed in each stabilizer extension system. There shall be one wear pad located on the top back portion of the extension tube assembly that shall glide on the inner wall of the top housing tube wall. There shall be an additional pad located on the inner wall of the bottom housing tube wall that shall separate the bottom side of the extension tube and the bottom wall of the housing tube. The pads shall be installed in such a manner as to reduce friction for ease of operation and to reduce the amount of metal-to-metal contact. Each stabilizer down-jack housing tube shall contain four wear pads, one on each side of the tubes.

LIGHTS, STABILIZER WORK

A 4" LED flood light shall be provided at each stabilizer location to illuminate the surrounding area. The lights shall be activated by the aerial master switch.

LIGHTS, STABILIZER WARNING

Two Whelen model TIR6 LED red flashing lights shall be mounted below each stabilizer beam, facing front and rear. These warning lights shall be activated by the aerial master switch.

STABILIZER CONTROLS, ELECTRIC ACTUATED HYDRAULIC

The outriggers shall be incapable of movement with the aerial ladder out of the travel position, per NFPA 1901, 19.17.5(1). In compliance with NFPA 1901, 19.21.4.1, the outrigger controls shall be arranged so that the operator has a direct line-of-sight to the stabilizers being positioned. Use of mirrors or other indirect means of watching the outrigger deployment are not acceptable. The stabilizer controls shall be located at the rear of the apparatus. Two control stations shall be provided, one on each side at the rear. All stabilizer control functions shall be electric paddle type. The outrigger controls must move in the same direction the operator would anticipate the outrigger moving. The make and model of the actuator shall be the P-Q controls, model M105. The controls shall be designed to allow the stabilizers to be operated independently so that the vehicle may be set up in a restricted area or uneven terrain. An electrically actuated diverter valve shall be provided in conjunction with the stabilizer controls as a safety device. The diverter valve shall allow the hydraulic fluid to flow to either the stabilizer circuit or the turntable and ladder circuit, but not both simultaneously. A stabilizer deployment warning alarm, activated by moving the diverter valve to the stabilizer mode and deploying an outrigger shall be provided at each stabilizer to warn personnel. The warning alarm shall deactivate only when all stabilizers are in the load-supporting configuration, or when the diverter switch is no longer in the stabilizer mode.

GROUND CONTROL STATION

A control station shall be located at the rear of the apparatus in an easily accessible area. Per NFPA 1901, 19.17.6, the control panel shall be arranged so the controls are easy to distinguish and operate, illuminated for nighttime operation, and properly labeled. To protect the controls and instrumentation, an aluminum tread plate door shall be provided over the rear control station. The door shall be painted with a black ruggedized material. The door shall be attached with piano style hinge and have two push button quick release latches. The following items shall be furnished at the control console, clearly identified, and located for ease of operation and viewing:

- Individual stabilizer down indicator lights
- Aerial PTO engaged indicator light
- High idle switch with indicator light
- Emergency hydraulic pump control with indicator light
- Stabilizer/Aerial diverter control with indicator light
- Side to Side leveling bubble

A front to rear level indicator shall be provided inside the torque box. A weatherproof compartment shall be furnished behind the control panel containing the aerial circuit breakers, interlock components, and control circuit distribution terminals. A recessed work light shall be provided in the access door.

TURNTABLE

The turntable shall be a minimum of 95" side to side and 95" forward to aft. The turntable deck shall be covered with a rugged tread decking to allow the walking surface to shed liquids with unparalleled ease and comply with NFPA intent, to provide secure footing for the operator in all weather conditions. A downward lip shall skirt the turntable decking around its entire circumference to provide protection from hazards. There shall be three handrails provided at the turntable. Handrails shall be fabricated from high quality, 1¼" diameter, stainless steel tubing with a deep knurled finish to meet NFPA slip resistance requirements. Each handrail section shall be of a one-piece construction and provide large sweep corners at the edge of the turntable. Each handrail section shall be 42" high. The handrails shall be installed around the rear 180° perimeter of the turntable for operator and personnel safety. Each individual handrail shall be secured to the turntable by the use of two minimum 5/8" anchor bolts on the underside of the turntable. Additionally, chrome plated stanchions with rubber gaskets shall be provided on the top surface of the turntable where each railing meets the decking surface. All hoses and electrical lines shall be routed under removable covers so they do not present a tripping hazard. The covers shall also be designed to prevent damage from occurring to these components. Likewise, the center of the turntable shall have a removable step cover to prevent tripping hazards as well as provide for easier transition to the first rung of the aerial ladder. A single access staircase shall be supplied on the driver`s side of the apparatus to the aerial turntable. The angled staircase shall be supplied with extruded aluminum handrails on both sides of the staircase frame. All handrails shall be painted in a black ruggedized material.

AERIAL PIVOT PINS

The aerial device pivot pins shall be located on the turntable and shall attach the aerial device base section to the turntable. To maintain a suitable safety factor, the pivot pins shall be composed of certified structural steel. In the interest of safety, the pivot pins shall be located as low as possible, and shall be at the aerial device base rails. This shall keep the pivot points away from the areas where persons egress to and from the aerial base section. Aerial pivot pins shall be installed with a means provided to keep the pins in place. The design shall not inhibit the pins from being removed by a trained mechanic.

MANSAVER BARS

Fire Research Mansaver MSA120 safety bars shall be installed between the two gaps in the handrails at the left and right side entranceways to the turntable. The safety bars shall be permanently attached at one end they shall open either upward or inward, and are spring loaded automatically returning to the horizontal closed position. The safety bars shall be uncovered constructed from aluminum and stainless steel. The bars shall be painted in a black ruggedized material.

CONTROL CONSOLE, TURNTABLE

A street-side control console shall be provided on the turntable. The console shall have a hinged aluminum tread plate cover, painted with a black ruggedized material, and illuminated for nighttime operation. Gas shock hold open devices shall be provided to secure the lid in the open position. The gas shock shall assist in closing the cover when it is positioned over center. The console surface shall be angled toward the operator so controls may be viewed and operated ergonomically. When the console lid is closed, the lid and control panel shall be isolated from

each other, preventing metal-to-metal contact. Three handles for the ladder hydraulic functions (elevation, rotation, and extension) shall be installed at the control console. To comply with NFPA 1901, 19.17.7, the controls shall be distinct from the remainder of the other actuators and instruments on the turntable control console, and be manual for safety and durability reasons. There shall be no exceptions allowed to this requirement. A cast alloy plate with openings for the aerial function levers to extend through shall be provided, which shall encircle the control levers. The function of each control lever shall be cast into the plate under the appropriate lever. The levers shall be separated by enough distance so that a gloved hand shall not disturb an adjacent control, per NFPA 1901, 19.17.6.5. The controls shall be capable of being operated independently or simultaneously with a gloved hand. The speed of movement caused by moving any control shall be minimally affected when multiple controls are moved. In compliance with NFPA 1901, 19.17.6.2, a push/pull systems engagement control shall be installed at the control pedestal. The control shall energize the hydraulic system for ladder function and provide flow of hydraulic fluid to the master valve bank. An automatic throttle switch shall be attached to the systems engagement control that advances the engine speed to a preset RPM, when the midship pump is not engaged. Each item provided on the console not labeled from the manufacturer, shall be provided with a permanent cast alloy label. The information on the label shall be stamped or professionally engraved for lasting durability. A hinged service door shall be provided on the front of the control console. This door shall be provided with a lift and turn latch. Opening of this door shall allow access to the electrical wiring, valves, and inner components for inspection purposes. A recessed work light shall be provided on the outside of the service door to aid in lighting the deck area. The following items shall be furnished at the console, clearly identified, and located for ease of operation and viewing:

- Elevation, Extension and Rotation Controls
- Lighted Push/Pull Button to Deactivate Hydraulic System
- Fast Idle Switch
- Cover Mounted Panel Light
- Rung Alignment Light
- Bed Zone Indicator Light
- Ladder Light Switches
- Ladder Overload Warning Horn
- Hydraulic System Pressure Gauge
- LoadMinder display panel
- AirMinder display panel and alarm (if equipped with breathing air)
- Emergency Pump Unit Momentary Switch and Light
- Electric Monitor Controls
- Straight/Fog
- Up/Down
- Left/Right
- Intercom with Push-to-Talk and Volume Controls
- Operators Load Chart
- Warning Signs

CREEPER CONTROLS AT LADDER TIP

There shall be a set of aerial ladder creeper controls at the tip of the fly section. The control module shall consist of three spring loaded, triple-pole, double-throw, and return to center switches, one for each aerial ladder function: raise/lower, extend/retract, and left/right rotation. Each function switch shall have a permanently affixed black and white label adjacent to the switch. Each switch shall be encircled by a rubber boot to protect it from collecting moisture. The creeper control shall allow the crew member on the tip of the ladder to operate these three functions within the speed limitations as set forth in NFPA 1901, 19.5.4(1) through 19.5.4(4). A stainless steel guard shall be installed to help prevent switches from being damaged or actuated

from activity on the tip of the aerial ladder. A foot pedal shall be installed at the lower control station to activate the system. When in the normal position, the system shall be de-energized. When the pedal is depressed and held down, power shall be available to the person at the tip.

LOAD MINDER

There shall be a LoadMinder at the operator's pedestal indicating the load on the aerial device. The display shall be in the form of an LED illuminated bar graph. The instrument shall be readable in day and night conditions. The display shall be a "real time" display, thereby giving immediate readings to the operator. Additionally, a color-coded bar shall be above and below the actual LED bar graph, to surround the actual reading given to the operator; thereby making the display easier and faster to read. The color-coded bars shall progress from Green to Yellow, and finally to Red. When the LED bar graph illuminates, representing a load on the aerial ladder, the operator need only glance at the display to determine the load applied to the aerial device - in relation to 100% rated aerial device capacity. The readout given by the display shall be continuous and relative to the NFPA compliant aerial device rated capacity as stated in these specifications. The Load Minder display shall include, but not be limited to, the following items:

- Accumulated equipment on all ladder sections, or at the platform including manufacturer installed items or customer installed items
- Accumulated personnel on all ladder sections or at the platform
- Accumulated ice buildup on all ladder sections or at the platform
- The total load suspended from any load lifting / rappelling eye installed by the manufacturer
- Any load reaction from dynamic loads placed on or realized by the aerial structure
- Any water weight or reactionary force realized by the aerial structure
- Any combination of the above items

The Load Minder as described shall be designed in such a manner that the operator shall not have to refer to an angle indicator, extension tape, or load chart; or be required to guess at, or try to calculate the loads or forces applied to, or interacting with the aerial device at any given time, and in any situation. This shall comply with the current edition of NFPA 1901. Systems that require the use of a load chart, angle indicator, or extension tape shall not be acceptable for safety reasons. The Load Minder shall be connected to a 100 dB alarm at the operator's control station that shall sound when the ladder load is above the rated capacity. This alarm system shall also be connected to two amber strobe lights on the end of the base section, one on each side, to provide further notice to the operator of an unsafe condition. A second audible and visual alarm shall be installed at the tip of the ladder.

AIR HORN SWITCH, TURNTABLE

A push button momentary switch shall be mounted on the aerial turntable console to activate the chassis air horns.

INTERLOCK SYSTEM, AERIAL STOW OPERATION

A safety feature shall be included in the aerial operational system that limits the possibility of damage to the apparatus when stowing the aerial. When the aerial is positioned over the cab area of the apparatus, the interlock system shall not allow the downward movement of the aerial to go below a preset angle of elevation, unless the aerial is rotated into the stow-zone envelope. The stow-zone shall be approximately 2° of rotation to the left and right side of the center of the aerial bed support. Once this stow-zone envelope is attained, downward movement of the aerial shall be allowed for proper positioning into the bed support. An indicator light shall be located at the turntable control station to inform the aerial operator when the stow-zone envelope is attained.

INTERLOCK SYSTEM, APPARATUS BODY DAMAGE CONTROL

A safety feature shall be included in the aerial operational system that minimizes the possibility of damage to the apparatus body at all angles for all standard (non-override) operational modes. The system shall automatically stop the downward movement of the aerial at a preset angle of elevation unless the aerial has been rotated at least 80°, left, or right, from the center of the ladder support. Once this rotation point is reached, full range downward movement to -6° shall be allowed. The aerial manufacturer shall determine and set the angle of elevation where downward aerial movement is stopped. The highest point of an apparatus, in relation to the distance from the turntable, shall be used to determine the preset elevation angle stopping point. The system shall also minimize the possibility of accidental damage to the apparatus body from aerial rotation whenever the aerial elevation is below the preset elevation angle stopping point. Aerial rotation shall be automatically stopped before the aerial contacts the body of the apparatus and the rotational speed shall be reduced by approximately 50% when the aerial is rotated to within a minimum of 10° of a body avoidance stopping point. The body damage interlock system shall have no effect on aerial operation when the aerial is raised above the preset downward movement stopping point. The body damage interlock system shall not reduce the operating envelope to protect components such as telescopic lights that are in a raised position.

INTERLOCK SYSTEM, ROTATION

The aerial device shall be equipped with a rotation interlock system to prevent the ladder from being rotated to any side where the stabilizers are not sufficiently extended to provide for the full tip load rating. The system shall monitor the stabilizers for extension. When the apparatus has a stabilizer not fully extended, or short-jacked, to provide full tip load rating, the system shall prevent the aerial from being rotated more than 12° past the front or rear centerline into the short-jacked side of the apparatus. Once activated, the system shall prevent the aerial from being rotated past the front or rear corner of the apparatus where a stabilizer is not properly deployed. A slowdown feature shall be built into the rotation interlock system. When the aerial is operating in a short-jacked mode, the rotational speed shall be automatically reduced, by approximately 50%, when the aerial is rotated to within approximately 10° of the front or rear centerline of the apparatus. The rotational speed shall remain reduced throughout an arc of approximately 20° over the front or rear of the apparatus, regardless of the direction of the rotation movement. The rotation function shall automatically stop when the aerial approaches the front or rear corner area of the short-jacked side of the apparatus. The rotation interlock system shall allow for normal operation on the side of the apparatus where the stabilizers are sufficiently extended for full tip load rating.

INTERLOCK SYSTEM, RETRACTION

An integral part of the extension/retraction system shall be a safety system to prevent injury to personnel on the end of the fly section while the ladder is being retracted. This system shall be designed in such a manner as to prevent retraction of the aerial device any time the folding steps at the end of the fly section are in overlap with the rungs of another section. When the steps are in an overlap condition, retraction shall only be accomplished by an operator at the primary control station depressing and holding a momentary switch while the retraction control is operated. In the interest of firefighter safety, no exception shall be allowed to the retraction safety interlock.

INTERLOCK SYSTEM, CRADLE

A cradle interlock system shall be provided to prevent the lifting of the ladder from the nested position until the operator has positioned all of the stabilizers in a load-supporting configuration. A switch shall be installed at the cradle to prevent operation of the stabilizers once the aerial has been elevated from the nested position. There shall be a manual override switch, which allows the ladder to be lifted from the cradle when the aerial is set up in the short-jacked configuration.

AERIAL WATERWAY

A four-section, telescopic aerial waterway shall be provided, consisting of a 5" outside diameter steel pipe in the base section, a 4.5" diameter pipe on the next section, and a 4" outside diameter pipe on the third section, and a 3.5" outside diameter pipe in the fly section. The waterway pipe shall be connected to the waterway swivel. A 4" inside diameter pipe shall be routed through the rotation point swivel up to the heel pin swivel. The heel pin swivel shall allow the rated flow of the waterway while elevating the aerial ladder from -6° to +72°. The heel pivot pin shall not be integral with the waterway swivel at any point. The design of the water way shall allow complete servicing of the waterway swivel without disturbing the heel pivot pin. A 4½" outside diameter pipe shall be connected from the waterway discharge valve to the water swivel at the rotation point of the turntable. The water swivel shall allow the ladder to rotate 360° while continuing the rated water flow of 1,500 GPM.

DUAL POSITION WATERWAY

The waterway monitor shall be capable of being placed in one of two positions, either at the end of the fly section or at the end of the third ladder section. This is required to keep the ladder tip clear of obstructions when the aerial device is used in rescue operations, as described in NFPA 1901, A.19.6.4.5. The waterway shall retain the same 1,500 GPM flow capacity, regardless of monitor position.

WATER FLOW CAPABILITIES

Rotational torque shall be more adequate to rotate the ladder into a full 1500 GPM water stream directed at 90° to the side while maintaining the 750 pound tip load at 0° elevation. Flowing at the rated 1,500 GPM shall in no way affect the rated load or impose any restrictions on operation.

CONTROL STATIONS, ELEVATED MASTER STREAM

The aerial master stream device shall have two separate control stations. One station shall be at the main aerial turntable control console the other station shall be located at the tip of the ladder. Each station shall have the capability of controlling the nozzle pattern as well as the horizontal and vertical position of the device.

AUTO STOW

The monitor shall be equipped with an auto-stow feature that shall position the monitor at horizontal when the ladder is stowed. A stow button shall be provided on the turntable control console. Interlocks shall be provided that prevent the ladder from being lowered into the cradle if the monitor is not in the travel position.

DISCHARGE, LADDER TIP

There shall be a 2½" discharge located at the tip of the aerial ladder. The discharge shall have a Task Force Tips VUM, model AKM13-B181D manually controlled monitor valve provided under the monitor. The valve shall be controlled with an NFPA compliant slow-close crank handle gear operator. A position indicator shall be provided to allow for quick visualization of the status of the valve in the open, closed or partial positions. The unit shall have a flow capability of up to 2,000 GPM with friction loss no more than 6 PSI. For maximum corrosion protection the aluminum casting shall be hard coat anodized, with a silver powder coat internal and external finish. The valve ball shall be stainless steel and have an automatic drain for draining waterway when valve is closed and unpressurized. The unit shall have a unique serial number and be covered by a five year warranty. The valve shall be configured with a 4" ANSI 150 flange inlet and 4" ANSI 150 flange outlet. Port C1 shall have a left hand elbow quarter turn ball valve with 2½" NH male outlet installed, extended 4¾" from main valve. C2 and C4 shall have blind plugs installed. C3 shall have an External Automatic Drain Valve. All 2½" NH male

discharges shall have a 2½" NH female by 1½" NH male thread reducer and a 1½" NH female cap with lanyard.

VALVE, WATERWAY RELIEF
A ¾" safety relief valve shall be installed in the base section waterway. The relief valve shall be pre-set at 240 PSI. The valve shall protect the waterway from overpressure. This valve is not intended to act as a relief for the total flow of the system.

VALVE, WATERWAY DUMP
There shall be an automatic relief valve installed in the aerial waterway to prevent over pressurization of the waterway seals.

VALVE, WATERWAY DRAIN
There shall be a 1½" drain valve installed in the lower section of the aerial plumbing, beneath the aerial swivel, under the truck. The valve shall be controlled with a push-pull rod that utilizes stainless steel universal swivel joints for an easy pull. The valve, when opened, shall drain the aerial waterway and associated plumbing.

REAR INLET/OUTLET, AERIAL WATERWAY
The aerial waterway shall be capable of being supplied by both an onboard pump and by an external water source. Additionally, the aerial waterway inlet piping shall have a two-position valve allowing the waterway inlet to be used as a pump discharge. The two-way shall be air actuated and controlled from the pump panel with the actuator adjacent to the waterway discharge valve. The air actuator shall be labeled "WATERWAY INLET" and "REAR DISCHARGE". There shall be an additional label reading "WATERWAY DISCHARGE VALVE MUST BE OPEN AND AIR ACTUATOR IN REAR DISCHARGE MODE TO USE AS A REAR DISCHARGE". A 4" diameter waterway piping shall be provided the rear of the apparatus to the aerial pre-piped water system. A female 4" pipe thread to 4" NST male chrome plated adapter with screen and cap shall be provided for the connection of adapters or Siamese for fire hose. A 2½" diameter liquid filled water pressure gauge shall be located above the rear inlet. A 1½" push-pull waterway drain valve shall be provided beneath the turntable with controls located below the rear inlet. Warning plates shall be permanently affixed in a location in proximity to the aerial waterway inlet that read: "WARNING - SERIOUS INJURY OR DEATH COULD OCCUR IF INLET IS SUPPLIED BY A PRESSURIZED SOURCE" and "WARNING – SERIOUS INJURY OR DEATH COULD OCCUR IF WATERWAY INLET CAP IS REMOVED WHILE WATERWAY IS FLOWING".

ELEVATED MASTER STREAM APPLIANCE
An Akron Brass Sabermaster 1250, remote controlled, all electric, single waterway monitor shall be installed at the tip of the ladder. The monitor shall be equipped with two 90° drive positioning motors, one each for vertical and horizontal movement. Each positioning control shall be equipped with a manual override. The monitor shall be capable of vertical positioning from -135° to + 30° and horizontally 90° from side to side for a full 180° sweep. The rated tip load of the aerial device, when nozzle is flowing at horizontal or below, shall not be affected by the position of the nozzle throughout the entire range as listed above. The rated tip load of the aerial device, with the nozzle flowing above horizontal, shall be reduced by 250 pounds. The monitor shall be painted the same color as the bolt on egress, unless otherwise specified by the customer.

NTERCOM SYSTEM, AERIAL
A two-way, two-station Fire Research ACT intercom system shall be furnished on the aerial ladder. Intercom communication shall be between the ladder tip and the turntable control console. The turntable station shall be push-to-talk with separate transmit and receive volume

control knobs. The ladder tip station shall have a hands-free speaker/microphone unit, requiring no operator attention to transmit or receive.

COMMUNICATION PRE-WIRE, TIP TO TURNTABLE

Wiring for a headset style intercom system shall be provided from the aerial ladder tip to the turntable. This shall be used for installation of fire department specified intercom equipment. The department shall specify the manufacturer of the communication system to be used, i.e., David Clark, Sigtronics, Firecom, and SetCom; so the manufacturer can purchase the correct wiring and harness kits. Other components of the intercom system to be provided by the manufacturer shall be specified by the fire department.

LIGHTS, TURNTABLE WORK

The turntable shall be lighted for nighttime operation with a minimum of three LED work lights. The lights shall activate automatically through the aerial master switch, day or night. The work lights shall be positioned so that the light shall be directed toward the decking. The lights shall have black ruggedized hoods to keep light from glaring upward into the operator's eyes. An additional LED light shall be recess mounted in the front access door of the control stand.

LIGHTS, BASE SECTION TRACKING

Two Whelen Pioneer Micro MPBW, 12V LED lights shall be furnished, one on each side on the base section lower chord. The tracking lights shall be controlled from the turntable control station. The 45 watt +12 DC Micro Pioneer lighthead configuration shall incorporate 12 white Super-LED® with a TIR reflector installed in white die-cast powder coated aluminum housing. The MPBW shall have a standard 8° spot light lens and have the ability to change the optics with three different flood light pattern lenses provided with the Micro Pioneer. The additional lens patterns are 40° x 20° flood, 40° x 8° flood, and 90° x 20°flood. The MPB4B shall include a white powder coated bail bracket with a 3/8” stainless steel stud carriage bolt and stainless steel mounting hardware. The Micro Pioneer light shall have 4,100 usable lumens. A cast aluminum alloy lens retainer with a liquid injected silicone gasket shall protect against environmental conditions. The hard coated lenses shall provide extended life/luster protection against UV and chemical stresses. The MPBW shall be shall be vibration resistant. The Pioneer PC boards shall be conformal coated for additional protection. The MPBW shall have extended LED operation with low current consumption and low operating temperature. Two breathable membrane patches shall be installed to the bottom of the housing to maintain a consistent internal pressure. The MPBW shall be furnished with a 6’ 2/C 18GA unterminated cable. The MPBW is covered by a five year factory warranty.

LIGHT, LEFT LADDER TIP

There shall be one Whelen PFP1 light furnished at the tip of the fly section left side. A switch located on the lamp head shall activate the light. The Whelen Pioneer Plus Model PFP1 shall be provided. The 75 watt + 12V DC Pioneer lighthead shall incorporate Super-LED single flood light installed in die-cast white powder coated aluminum housing. The PFP1 configuration shall consist of 30 white Super-LEDs, a clear optic collimator/metalized reflector assembly and a clear non-optic polycarbonate lens. The Pioneer flood light shall have 8,100 usable lumens. The lens/reflector assembly shall utilize a liquid injected molded silicone gasket to be resistant to water, moisture, dust, and other environmental conditions. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The PFP1 shall be shall be vibration resistant. The Pioneer PC boards shall be conformal coated for additional protection. Two breathable membrane patches shall be installed to the bottom of the housing to maintain a consistent internal pressure. The PFP1 shall have extended LED operation with low current consumption and low operating temperature. The PFP1 is covered by a five year factory warranty.

LIGHT, RIGHT LADDER TIP

There shall be one Whelen PSP1 light furnished at the tip of the fly section right side. A switch located on the lamp head shall activate the light. The Whelen Pioneer Plus Model PSP1 shall be provided. The 75 watt + 12V DC Pioneer lighthead shall incorporate Super-LED single spot light installed in die-cast white powder coated aluminum housing. The PSP1 configuration shall consist of 30 white Super LEDs with 8° TIR reflector and a clear non-optic polycarbonate lens. The Pioneer spot light shall have 8,000 usable lumens. The lens/reflector assembly shall utilize a liquid injected molded silicone gasket to be resistant to water, moisture, dust, and other environmental conditions. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The PSP1 shall be shall be vibration resistant. The Pioneer PC boards shall be conformal coated for additional protection. Two breathable membrane patches shall be installed to the bottom of the housing to maintain a consistent internal pressure. The PSP1 shall have extended LED operation with low current consumption and low operating temperature. The PSP1 is covered by a five year factory warranty.

120-VOLT RECEPTACLE

There shall be one 120 volt twist lock receptacle mounted on the end of the fly section. The receptacle shall be wired through the electrical swivel, and shall be controlled from the breaker box located in the body. This outlet will be powered by either a rear compartment portable generator, or by an apparatus-mounted generator (TBD). The outlets shall be rated for 15 amp service, unless otherwise specified by the customer.

LIGHTING, RUNG SAFETY

The aerial ladder sections shall be equipped with permanently mounted blue LED rung lighting on the three lower sections, and red LED lighting on the fly section. The lights shall be mounted inside each of the four ladder sections, along the base chord facing inward. They shall be in an alternating arrangement. The blue and red LEDs shall serve to illuminate climbing rungs without inducing any glare, which would hinder safety. A minimum of six lights shall be provided on the fly section and a minimum of four lights on each of the three lower sections. The lights shall be energized by a switch on the turntable control station. Each light shall be equipped with an integral guard to protect it from damage. The light itself shall be positioned such that all light shall be directed inward toward the rungs of the aerial sections, maximizing safety for all climbers during night operations. The lights shall also aid the operator in locating aerial ladder section in conditions of reduced visibility. Reflective tape, phosphorescent paint, or similar non-electrically powered products shall not be an acceptable substitute for blue rung lighting. For the reasons of fire fighter safety, there shall be no exception to this requirement.

AERIAL FINISH

All aerial components, above the rotation point, that are not chrome plated, anodized aluminum, aluminum tread plate, or stainless steel shall be painted. All areas to be painted shall be sanded to remove any metal flakes and smooth any rough surfaces. All surfaces to be painted shall be phosphatized to remove metal impurities, aid paint adhesion and inhibit rust. The components shall be prime painted with a low VOC high solids non-isocyanate primer and finish painted with a low VOC extremely durable, single stage ultra-high solids high gloss polyurethane paint. The support structure and components below the rotation point shall be painted black. To enhance durability and appearance, the high gloss polyurethane paint applied to the aerial ladder sections and other components above the rotation point, shall be cured at an elevated temperature for a period not less than two hours. The temperature shall not be less than 180°F. Curing of the paint shall promote a chemical reaction within the substrate that shall harden the paint. The curing shall be performed in a clean, sealed, controlled atmosphere. The atmosphere shall comply with all environmental standards and any air entering the chamber shall be filtered.

AERIAL DEVICE PAINT COLOR
The aerial device shall be painted gray.

OUTRIGGER FINISH
The extending stabilizer beams, inner jack cylinder protective tubes, and stabilizer pads shall be hot dip galvanized as follows. The extending stabilizer beams, inner jack tubes, and stabilizer pads shall be wheel-o-braided to remove any mill scale, or contamination prior to galvanizing. Following this preparation, the individual outrigger assembly components shall be hot dip galvanized. The galvanizing process shall require that the entire assembly be completely submerged. Following the galvanizing process, the surface shall be ground smooth to remove dross. This preparation shall provide maximum protection for these critical components. Following surface preparation, components shall be coated with black water base self-etching coating.

LOAD CHART
There shall be a load chart (instruction plate) installed at the turntable control console of the aerial ladder. The load chart shall cover the full operating range of the ladder, with the waterway dry or flowing water.

SAFETY SIGNS, NFPA 2016
The following safety signs shall be provided where applicable:

- FAMA 25 (Training Required): One sign visible to the operator at the main aerial controls
- FAMA 30 (Stabilizer Crush): One sign visible to personnel near each stabilizer and one sign at the stabilizer deployment controls
- FAMA 31 (Stabilizers with Pins) or FAMA 32 (Stabilizers without Pins): One sign in a location visible to personnel at the stabilizer deployment controls
- FAMA 32 (Stabilizer Pads): Visible to stabilizer deployment operator
- FAMA 33 (Stabilizer not Extended): Visible to stabilizer deployment operator
- FAMA 34 (Fall Restraint Required): One sign in a location visible to personnel at the base of any aerial device with a ladder capable of being climbed and one sign visible to personnel in any aerial platform
- FAMA 35 (Electrocution): One sign in a location visible to the aerial operator and one sign in a location visible to the pump operator
- FAMA 36 (Electrocution): One sign on each side of the vehicle and one sign on the back
- FAMA 37 (Aerial Device Load Capacity): One sign visible to operators at any location where the aerial can be controlled
- FAMA 38 (Aerial Ladder Rung Pinch): One sign visible to operators at any location where the aerial can be controlled
- FAMA 39 (Aerial Inspection and Maintenance): One sign visible to the operator at the main aerial controls

- FAMA 40 (Fall Protection Anchor): Visible next to each fall protection anchor

- FAMA 46 (Aerial Device Pinch): One sign on aerial device visible to personnel on the turntable at the foot of the device

- FAMA 47 (Aerial Operator Attention Required): Visible to aerial operator at turntable, in the platform, and at tip controls

PLATE, AERIAL INFORMATION SPECIFICATION

A permanent affixed plate shall be installed on the apparatus and disclose the following information relative to the aerial device.

- Make
- Model
- Insulated or Non Insulated
- Serial Number
- Date of Manufacturer
- Rated Capacity
- Rated Vertical Height
- Rated Horizontal Reach
- Maximum Hydraulic System
- Hydraulic Oil Type and capacity

CERTIFICATIONS, INDEPENDENT THIRD PARTY

All bids shall include copies of the certification of testing of the aerial device. The purchaser desires a device that has been tested by a third party for compliance with the 2:1 safety factor specified by NFPA 1901, section 19.24 through 19.25. Devices that have not been certified by an engineer that is independent of the manufacturer shall not be acceptable. To meet or exceed the intent of NFPA 1901, section 19.22, the following system shall be employed by the manufacturer. Welds shall be tested using two non-destructive methods by an independent third party inspection firm. Steel and aluminum ladders shall, at a minimum, have all welds tested using two separate NDT methods, in accordance with NFPA 1901, 19.22.2. Aerial structures shall have 100% of all structural welds tested using both magnetic particle method and visual testing method. Aerials that are fabricated of aluminum shall have 100% of all structural welds tested using dye penetrate method and visual method. Manufacturers who rely only on visual inspection, performed in-house or by a third party, as a primary method of testing shall not be considered and their bid shall be rejected.

NFPA AERIAL STABILITY FACTOR & TESTING

A minimum of 1.5:1 stability factor shall be provided, per NFPA 1901, 19.21.2 and 19.24.2. These capabilities shall be established in an unsupported configuration. Since the device is rated while flowing water stability testing shall account for the distributed weight of water in a full waterway and water reactionary force as required by NFPA 1901. The following are specific descriptions of what test are to be performed, the conditions they shall be performed under, and strictly adhered to by the aerial manufacture set forth in these specifications and the current edition of NFPA 1901. For both of the following tests, the only obstructions to a full 360° rotation with the aerial at 0° elevation and full extension; shall be presented by the apparatus itself (if any), and not external obstructions at the manufacturer's test location. The aerial device manufacturer shall ensure that the testing grounds present no obstruction, i.e., trees, buildings, etc., to the full 360° rotation at 0° elevation and full extension, which may cause the need to raise the aerial to clear the obstruction.

TEST 1
After the above conditions have been satisfied, the aerial shall be subjected to the following test in the presence of the third party testing company that complies with these specifications. Specifically, the aerial device shall be placed on level ground with the stabilizers deployed per manufacturer recommendations. The aerial device shall then have 1½ times the rated capacity placed at the tip of the aerial, with the device at full extension and at 0° elevation, which is the most stringent configuration. The device shall be rotated 360° rising and lower the aerial as needed to clear the cab of the apparatus. The aerial shall prove to be stable during the entire test and no component of the aerial shall permanently deform.

TEST 2
After the above conditions have been satisfied, the aerial shall be subjected to the following test in the presence of the third party testing company that complies with these specifications. Specifically, the aerial device shall be placed on a 5° downward slope with the stabilizers deployed per manufacturer recommendations. The aerial device shall then have 1.33 times the rated capacity placed at the tip of the aerial, with the device at full extension and at 0° elevation, which is the most stringent configuration. The device shall be rotated 360° rising, and lower the aerial as needed to clear the cab of the apparatus. The aerial shall prove to be stable during the entire test and no component of the aerial shall permanently deform.

INSPECTION CERTIFICATE, NFPA 1901 COMPLIANCE
A third party inspection certificate for the aerial device shall be furnished upon delivery of the aerial device. The purpose of this NFPA 1901 compliance inspection shall be to serve as proof to the customer that all applicable standards have been met or exceeded by the responsible aerial manufacturer. The following objectives shall be achieved as a result (this listing shall not be construed as being all inclusive):

- The device shall be inspected and tested in accordance with NFPA 1901 and NFPA 1911 standards for fire department aerials.
- All welds for structural components are to be performed by certified welders under the guidelines of AWS D1.1, D1.2, and D1.3.
- All testing shall be conducted by ASNT Level II or Level III technicians certified to ASNT CP-189 standard.
- All welds shall be inspected to AWS B1.10, Guide for the Non-Destructive Examination of Welds.
- All magnetic particle inspections shall meet ASTM E 709 Standard Guide for Magnetic Particle Testing.
- Ensure that all hardness and/or acoustic emission testing meets ASTM standards.
- Ensure that where applicable, components, equipment, and loose equipment carry the appropriate classifications, and / or certifications.
- Ensure that applicable instruction plates and signs are installed in visual positions.

AERIAL INSTRUCTION
There shall be three days of instruction shall be provided by a factory-employed trainer. Because the trainer should be extremely familiar with the apparatus being delivered, proposals that offer training by an independent contractor shall not be acceptable. The instruction program shall be designed to instruct the individual who has never utilized an aerial device, as well as, experienced operators. Fire department personnel shall be thoroughly taught the operating systems of the aerial device, including emergency operation. Introductory service skills utilizing the vehicle shall also be provided.

INSTRUCTION PROGRAM
The aerial apparatus instruction program shall instruct fire department personnel in the proper

operation, preventative maintenance and care of the aerial device. This instruction program shall be oriented toward a hands-on approach utilizing the new apparatus.

- Review personnel skill level and determine specific instruction requirements.
- Explain operation of the entire aerial device.
- Each participant shall be taught the necessary steps for safe operation and operate the aerial.
- Troubleshooting shall be emphasized and reinforced continually throughout the training period.
- Preventative maintenance procedures shall be set up and definite schedules developed to assure proper maintenance of the aerial device.
- Instruction on the proper use of tools, how to replace minor assemblies, and equally important in this program shall be when to call appropriate personnel for assistance.

WARRANTY, TWENTY-YEAR STRUCTURAL INTEGRITY

The aerial device shall be free of structural or design failure or workmanship for a period of 20 years from and after the date on which the apparatus is first delivered to the original purchaser or 100,000 miles whichever occurs first.

WARRANTY, TEN-YEAR WATERWAY & SEAL

There shall be a ten year warranty covering the waterway between the waterway swivel and the monitor at the tip, including the waterway seals. The warranty shall be effective from the date of delivery and shall require no special maintenance at the scene of the fire or special procedures other than following the normal ten hour preventative maintenance schedule.

WARRANTY, THREE-YEAR HYDRAULIC CONNECTIONS

The aerial hydraulic connections (tube/hose and port end) shall be free of defects in material and workmanship and leak free for a period of three years starting 30 days after the original invoice date. Hose assemblies shall be covered for a period of one year. Stainless steel hydraulic piping and fittings shall be covered for a period of three years.

WARRANTY, TWENTY-YEAR INTERNAL CORROSION

The majority of the internal structural members of the aerial structure shall be 100% concealed from oxygen. Concealed members are not subject to the possibility of corrosion attacking the metal from the interior. Structural tubing of the aerial structure that contains drilled holes or is exposed to outside air and elements shall be protected to eliminate the possibility of corrosion occurring from the inside of the tube. The interior of exposed tubing shall be coated with a compound labeled NWAC 120-4. The application of the coating shall be applied after the welding process of the aerial structure is complete and shall cover 100% of the interior of the structural tube. NWAC 120-4 is an effective cavity corrosion inhibitor that provides long-term protection for both ferrous and non-ferrous metals. The resulting water-repellant, flexible, air-dried film has a remarkable crevice penetrating, spreading, and clinging characteristic. The product dries to a nearly transparent film and provides maximum corrosion protection for all void spaces subject to humidity and condensation. Use of this process shall constitute a 20 year internal corrosion warranty for the aerial structure.

BRACKET, ROOF LADDER AT BASE SECTION

There shall be one set of brackets on the outside of the base section for a roof ladder. The brackets shall be installed between the aerial base section and the ladder sign plate. The brackets shall be formed using break and bend techniques for added strength and an outstanding appearance. To enhance durability, the brackets shall be coated with a bed liner type scratch resistant coating. Where the ladder rack is bolted to the aerial section or ladder sign, stainless steel fasteners shall be employed. When installed in the brackets, the roof ladder shall be retained

so that it shall not come out of the brackets unexpectedly.

COMPARTMENT, STOKES BASKET AT BASE SECTION

There shall be one stokes basket mounting bracket on aerial ladder base section. The brackets shall be formed using break and bend techniques for added strength. Where the brackets are bolted to the aerial section, stainless steel fasteners shall be employed. When installed in the brackets the Stokes basket shall be retained so that it will not come out of the brackets unexpectedly. A water tight hinged lid shall be installed over the stokes basket storage compartment. The lid shall be painted with a black ruggedized material.

ELECTRICAL SYSTEM

A 5 kw hydraulic generator and all appropriate wiring and electrical panels shall be installed. The generator shall supply power to the following: aerial fly section receptacle, cord reel (location to be determined), and three body-mounted receptacles (locations to be determined).

BODY ELECTRICAL

The body electrical system shall be designed as an integrated electrical package specifically engineered for fire apparatus application. The integrated electrical system shall be comprised of power distribution panels, which interface to the body and chassis through an engineered harnessing system. All chassis wiring shall be type "GXL" in accordance with S.A.E. J1128 and NFPA-1901. Wiring shall be color coded and include function codes every 3” inches on both sides. The electrical wiring harness shall be covered by a black split convoluted loom, rated at a minimum of 275º F.

DISTRIBUTION PANELS

The electrical distribution panels and circuits must be housed in each rear corner compartment or extrusion. The distribution panel shall incorporate a power and ground stud for connection to the internal circuits. All internal wire end terminals, including locking bulkhead connectors, shall be mechanically affixed to the wire ends by machine terminal crimping presses. No hand-crimped terminals shall be acceptable. All internal splices shall be ultrasonically welded connections - no butt style connections shall be acceptable. All internal wiring shall be of the high temperature GXL type wire and shall be protected by wiring duct wherever possible. Each side electrical distribution panel shall consist of 15 power distribution relays. The power distribution relays shall be replaceable, SPDT automotive style, rated at a minimum of 30 amps. The power distribution relays shall incorporate separate inputs, which are able to accept outputs from a load management system. The load management inputs must allow for the addition of a load management system before, during or after the time of delivery without requiring a rewiring of the existing distribution panel circuits. Connections to the distribution panel shall utilize Deutsch style bulkhead connectors. Screw clamp type connections are not acceptable. The distribution panel shall also contain circuit's ancillary to the required DOT signals and other body functions. The complete body electrical system shall be 100% documented and contain independent circuit diagrams with point to point wiring information, as shall as a general component diagram included in the apparatus manual. The body electrical panel shall be capable of being completely disconnected and fully tested by a computerized circuit analyzer. All electrical equipment switches shall be mounted on a switch panel mounted in the cab convenient to the driver. Light switches shall be of the marine grade rocker type with integral indicator light to show when lights are energized. All switches shall be appropriately identified.

WIRING PROTECTION

All 12 volt wiring shall be run in high temperature, rated at a minimum of 275º F, split loom for easy access to wires when trouble shooting.

12 VOLT TESTING

The apparatus low voltage system shall be tested and certified. A copy of certification shall be provided to the purchaser with the apparatus.

Reserve Capacity Test

The unit shall be run until all engines, engine compartment temperatures are stabilized and the battery system is fully charged. The engine shall be shut off and the minimum continuous electrical load be activated for ten minutes. All electrical loads shall be shut-off after ten minutes and the battery system shall then be capable of restarting the engine.

Alternator Performance Test at Idle

Minimum continuous electrical loads shall be activated while the unit is at idle speed.

Alternator Performance Test at Full Load

The total continuous electrical load shall be activated with the engine running up to the manufacturer's governed speed. The test duration shall be a minimum of two hours. Activation of the load management system shall be permitted during the test. If however, an alarm is sounded by excessive battery discharge as detected by the system or a system voltage of less than 11.8 volts DC for a 12 volt nominal system for more than 120 seconds, shall be considered a test failure.

Low Voltage Alarm Test

The engine shall be shut off and the total continuous electrical load shall be activated and continue to be applied until the excessive battery discharge alarm activates. The test shall be considered a failure if the alarm has not sounded within 140 seconds after the voltage drops to 11.8 volts.

EMI/RFI PROTECTION

The apparatus shall be manufactured to incorporate the latest designs in the electrical system with components that are state of the art to insure electromagnetic interference (EMI) and radio frequency interference (RFI) emissions are suppressed at the source. The apparatus shall have the ability to operate in typical fire and rescue situations with no adverse effects from EMI and/or RFI. The apparatus shall utilize components that are fully protected and wiring that utilizes shielding and loop backgrounds where required to control EMI/RFI susceptibility. The apparatus shall be bonded through ground straps. Relays and solenoids that are suspect to generating spurious electromagnetic radiation are diode and/or resistor protected to prevent transient voltage spikes. In order to prevent the radio frequency interference completely 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.

BACK-UP ALARM

There shall be one Whelen model WBUA107, 107 dB, electronic back-up alarm installed at the rear of the apparatus. The alarm shall be wired to the transmissions output signal and is automatically activated when the transmission is shifted into reverse.

LIGHTS, COMPARTMENT

LED strip compartment lights shall be provided on the apparatus. The lighting shall actuate when the compartment door is opened. Lighting must have polycarbonate lens to eliminate breakage from impact and eliminate heat buildup. The system shall exceed NFPA 1901 standard of one-foot candle average per four cubic feet of area. The maintenance-free LEDs last up to 100,000 hours. The lights operate in a range from 9 to 16 VDC, allowing the compartment lights to work even when the vehicle is idling. The track type lighting shall illuminate the entire compartment,

reducing shadows and dark spots from shelves or equipment. Two separate light fixtures in each compartment, including ladder tunnel.

DOOR AJAR SWITCHES

All apparatus body doors shall be provided with an auto door switch. These switches shall operate the compartment interior lights and activate the door ajar indicator on each side of apparatus body when the door is opened. There shall be a red door ajar light mounted in the cab, in view of the driver to indicate an unsecured door. There shall be a buzzer mounted in the cab that shall alert the driver.

LIGHTBARS, 22" FORWARD FACING

A pair of Whelen Mini Edge Ultra Freedom IV Linear Super-LED LC Series light bars model F4NMINI shall be provided, one on each side of the cab roof outboard forward facing. The F4NMINI shall consist of two 22" Mini Ultra Freedom IV light bars. Each Mini Ultra Freedom IV light bar shall incorporate an anodized extruded aluminum heavy duty base and cover chassis with two red Linear LED corner modules, two white Linear-LED light in the front center, and one red Linear-LED endcap light with clear optic lenses. The front of each corner module shall consist of 12 red Linear Super-LEDs installed on a conformal coated PCB board with a thermal pad/aluminum bracket heat sink assembly. The short red endcap Linear Super LED lights shall incorporate six red Super-LED installed on a conformal coated PCB board with a thermal pad/aluminum bracket heat sink assembly. The two short white center Linear Super-LED lights shall incorporate six white Super-LED installed on a conformal coated PCB board with a thermal pad/aluminum bracket heat sink assembly. The all modules will utilize a Diamond Optix metalized reflector and two optic collimators. All electronic components shall be conformal coated to provide additional protection. The outer lens construction shall consist of two clear Uni-Dome top lenses with a clear center lens and utilize a liquid injection molded wiper seal divider for maximum protection against environmental elements. Metal top shields installed on the Uni-Domes and center lens shall provide protection from climatic conditions and provides passive solar radiation to direct heat away from internal components. All light heads shall be installed in the F4NMINI with the aid of black polycarbonate snap-in mounting brackets. The solid state F4NMINI shall be vibration resistant. The light bars shall have a PCB light bar LED flashers with 15 Scan-Lock flash patterns with five Pattern Phases for each flash pattern. The light bars will contain a 20’ 9/c 18GA unterminated power/control cable. The F4NMINI shall be SAE Class 1 and California Title XIII compliant. The F4NMINI will also meet NFPA 1901 Zone A upper lighting standards. All electrical components are covered by a five year factory warranty. The F4NMINI shall include a permanent mount kit with stainless steel hardware. The light bars shall be controlled in the following manner: Calling for Right of Way - All Positions and Blocking Right of Way - Clear shall not be Active. The lights shall be activated by a single emergency light switch located on the light switch panel in the cab. The light bars shall meet NFPA 1901 edition as configured.

LIGHTS, ZONE C UPPER INBOARD

Two Whelen M6 Series Super-LED model M6RC shall be installed, one each side on the upper rear of the apparatus in the inboard position. The warning light shall incorporate red Super-LEDs, a clear non-optic hard coated polycarbonate lens, clear optic collimator and utilize a metalized reflector for maximum output. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The encapsulated lens/reflector assembly and conformal coated PC board shall provide additional protection against environmental elements. The solid state warning lights shall be vibration resistant. The self-contained flashing light shall have 164 Scan-Lock flash patterns including synchronize feature and steady burn. The warning light is covered by a five year factory warranty. The surface mount module includes a black ruggedized flange and hardware for horizontal mounting.

LIGHTS, ZONE B/D FRONT LOWER
Two Whelen M6 Series Super-LED model M6RC lights shall be installed, one on each side forward portion of the apparatus. The warning light shall incorporate red Super-LEDs, a clear non-optic hard coated polycarbonate lens, clear optic collimator and utilize a metalized reflector for maximum output. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The encapsulated lens/reflector assembly and conformal coated PC board shall provide additional protection against environmental elements. The solid state warning lights shall be vibration resistant. The self-contained flashing light shall have 164 Scan-Lock flash patterns including synchronize feature and steady burn. The warning light is covered by a five year factory warranty. The surface mount module includes a black ruggedized flange and hardware for horizontal mounting.

LIGHTS, ZONE B/D MIDSHIP LOWER
Two Whelen M6 Series Super-LED model M6RC lights shall be installed, one on each side midship of the apparatus. The warning light shall incorporate red Super-LEDs, a clear non-optic hard coated polycarbonate lens, clear optic collimator and utilize a metalized reflector for maximum output. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The encapsulated lens/reflector assembly and conformal coated PC board shall provide additional protection against environmental elements. The solid state warning lights shall be vibration resistant. The self-contained flashing light shall have 164 Scan-Lock flash patterns including synchronize feature and steady burn. The warning light is covered by a five year factory warranty. The surface mount module includes a black ruggedized flange and hardware for horizontal mounting.

WARNING LIGHTS, OUTRIGGER COVER PLATES
Four Whelen M6 series Super LED model M6 lights shall be mounted: two on each of the outrigger cover plates. The warning lights shall be activated by an emergency warning light switch. The warning light shall incorporate red Super LEDs, a non-optic hard coated polycarbonate lens, clear optic collimator and utilize a metalized reflector for maximum output. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The encapsulated lens/reflector assembly and conformal coated PC board shall provide additional protection against environmental elements. The solid state warning lights shall be vibration resistant. The self-contained flashing light shall have 164 Scan-Lock flash patterns including synchronize feature and steady burn. The warning light is covered by a five year factory warranty. The surface mount module includes a black ruggedized flange and hardware for horizontal mounting.

LIGHTS, ZONE B/D REAR LOWER
Two Whelen TIR6 Series Super-LED model 50R03ZRR lights shall be installed, one on each side rearward portion of the apparatus. The warning lights shall incorporate red Linear Super LEDs, a red optic hard coated polycarbonate lens. The surface mount module includes a black ruggedized flange and hardware for horizontal mounting.

LIGHTS, ZONE C LOWER
Two Whelen M6 Series Super-LED model M6RC shall be installed, one on each side on the lower rear of the apparatus. The warning light shall incorporate red Super-LEDs, a clear non-optic hard coated polycarbonate lens, clear optic collimator and utilize a metalized reflector for maximum output. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The encapsulated lens/reflector assembly and conformal coated PC board shall provide additional protection against environmental elements. The solid state warning lights shall be vibration resistant. The self-contained flashing light shall have 164 Scan-Lock flash

patterns including synchronize feature and steady burn. The warning light is covered by a five year factory warranty.

STOP, TURN AND BACK-UP LIGHTS

Stop, turn and backup lights shall be Whelen M6 Series, individual fixtures. The red stop (LED) light shall be model M6BTT, the turn light shall be model M6T amber (LED) type with directional arrow, and the backup light shall be white (LED) model M6BUW.

HOUSING, REAR TAIL LIGHT ASSEMBLY

The fixtures shall be mounted on each rear face of the body in a four lighthead black ruggedized housing.

CLEARANCE LIGHTS AND REFLECTORS

Clearance lights and reflectors shall be LED lights, which include two red marker lights, four red rectangular reflectors, two amber rectangular reflectors, and one red three light cluster recessed in the rear step.

LIGHT, LICENSE PLATE

A Whelen OS Series LED model 0SC0EDCR shall be provided at the rear of the apparatus to illuminate the license plate. The steady burn illumination light shall incorporate three clear LED and a clear non-optic hard coated polycarbonate lens. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The encapsulated assembly shall provide protection against environmental elements. The solid state illumination light shall be vibration resistant. An installation kit including mounting hardware, neoprene gasket and 45° angle chrome housing shall be provided for surface mounting. The 0AC0EDCR will contain a 12” non-terminated pigtail. The illumination light meets SAE J592 requirements and is covered by a five year factory warranty.

LIGHT(S), LED PERIMETER ILLUMINATION

Six Whelen 3” Round Super-LED® model 3SC0CDCR perimeter illumination lights shall be provided as specified. The steady burn illumination light shall incorporate six clear Super-LED and a clear non-optic hard coated polycarbonate lens for maximum output. The hard coated sealed lens shall provide extended life/luster protection against UV and chemical stresses. The light shall be wet sealed and vacuum tested to ensure proper sealing. The conformal coated PC board, powder coated die cast housing, and exterior rubber gasket shall provide additional protection against environmental elements. The 3SC0CDCR shall provide 360 usable lumens. The solid state illumination light shall be vibration resistant. The 3SC0CDCR will contain a 6" unterminated pigtail. The illumination light is covered by a five year factory warranty. The 3SC0CDCR requires a ¾” wire entry hole in the body of the vehicle and includes mounting screws and grommet.

LIGHTS, 12 VOLT SURFACE MOUNT SCENE

One pair of 65” Firetech Hiviz scene lights shall be provided and installed on the apparatus. The steady burn scene lights shall incorporate Linear Super-LED® and Smart LED® technology. The scene lights shall be installed, one each side of the cab, horizontally centered across the raised section of cab roof. The cab mounted scene lights shall be controlled by individual scene light switches located in the cab labeled LEFT SCENE and RIGHT SCENE and when the respective side cab doors are opened. The light head and mounting hardware shall be painted job color.

LIGHTS, 12-VOLT SURFACE MOUNT SCENE

One pair of Whelen M6 Series Model M6ZC scene lights shall be provided and installed on the apparatus. The steady burn scene light shall incorporate Linear Super-LED® and Smart LED® technology. The M6ZC configuration shall consist of 12 clear gradient Super-LEDs and a clear optic polycarbonate lens. The scene light, with the aid of two screws, shall have the ability to be installed as a surface mount scene light. The M6ZC shall meet KKK 1822F and AMD024 specifications. The lens/reflector assembly shall be sealed and resistant to water, moisture, dust, and other environmental conditions. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The light engine shall be installed at the rear of the unit and be vacuum tested to ensure proper sealing. The PC board shall be conformal coated for additional protection. The scene lights shall be installed, one each side on the upper rear inboard corners of the body. The upper rear body mounted scene lights shall be controlled by a scene light switch located in the cab labeled REAR SCENE and when the transmission is placed into reverse.

BROW LIGHT

One 72" Firetech Hiviz LED brow light kit with incorporated DOT marker lights shall be installed on the front cab. Wiring shall extend from a weatherproof strain relief at the rear of the lamp head. The cab mounted brow light shall be controlled by a light switches located in the cab labeled BROW LIGHT and will allow for flood, spot, and total scene operations. The light head and mounting hardware shall be painted job color which shall be determined at pre-construction meeting.

LIGHTS, PEDESTAL MOUNT

There shall be a pedestal mount light installed on each side above the specified compartments. Four Whelen Pioneer Plus Model PFP1 light heads shall be provided. The 75 watt +12v DC Pioneer lightheads shall incorporate Super-LED single flood light installed in a die cast white powder coated aluminum housing. The PFP1 configuration shall consist of 30 white Super-LEDs, a clear optic collimator/metalized reflector assembly and a clear non-optic polycarbonate lens. The Pioneer flood light shall have 8,100 usable lumens. The lens/reflector assembly shall utilize a liquid injected molded silicone gasket to be resistant to water, moisture, dust, and other environmental conditions. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The PFP2 shall be shall be vibration resistant. The Pioneer PC boards shall be conformal coated for additional protection. Two breathable membrane patches shall be installed to the bottom of the housing to maintain a consistent internal pressure. The PFP2 shall have extended LED operation with low current consumption and low operating temperature. The PFP2 is covered by a five year factory warranty. The lights shall be installed with a pedestal adaptor with a 1 1/8" adjustable sleeve, junction box and a large anodized aluminum alloy ergonomic knob at the knuckle. The lights shall be installed with a black fiberglass enforced poly carbonated handle. The pedestal mount lights shall be controlled by a switch located on the pump panel.

BODY PAINT FINISH, SINGLE COLOR

The body exterior shall have no mounted components prior to painting to assure full coverage of metal treatments. Box pan compartment doors shall be painted separately to assure proper paint coverage on body, doorjambs, and door edges. All painted surfaces shall follow the following procedure to insure a lasting finish: Metal surfaces shall be sanded to remove all burrs and imperfections, before etching and treatment. A wax and grease solvent shall be used to clean and prep the aluminum surface. The surface shall then be rinsed with fresh water. This step removes wax, grease and other surface contaminants, thus leaving a bright, clean, and conditioned surface. A self-etching, metal primer shall be applied next. The self-etching primer shall fill all of the minor imperfections, scratches, etc. in the metal. This step produces a corrosion resisting

conversion coating that prevents off oxidation and other surface contaminants leaving a surface that gives excellent paint adhesion. A sandable primer shall be sprayed on the metal that seals the surface for the polyurethane paint. A minimum coating thickness of 2 MIL shall be applied. Primer is then sanded smooth leaving the best surface for topcoat. The apparatus body shall then be painted with a minimum of three coats of color. These steps are followed as recommended by the paint manufacturer to provide a lasting and high quality gloss finish. DuPont shall provide all paint products.

PAINT, INTERIOR COMPARTMENT
The interior of the body compartments shall be painted with a ruggedized material.

PAINT, FRONT BUMPER
The front bumper shall be painted job color and shall be determined at pre-construction meeting.

PAINT, FRONT BUMPER LIP
The front bumper lip shall be painted with black ruggedized material.

PAINT, FRONT BUMPER GRAVELSHIELD
The front bumper gravelshield shall be painted with black ruggedized material.

PAINT, FRONT BUMPER COMPARTMENT
The front bumper compartment shall be painted with black ruggedized material.

PAINT, FRONT BUMPER COMPARTMENT LID
The front bumper compartment lid shall be painted with black ruggedized material.

PAINT, ROOF LADDER BRACKETS AT BASE
The roof ladder brackets at the base section of the ladder shall be painted with black ruggedized material

PAINT, STOKES BACKET MOUNTING BRACKETS
The stokes basket mounting brackets shall be painted with black ruggedized material.

PAINT, AERIAL TURNTABLE
The aerial turntable shall be painted with black ruggedized material.

PAINT, AERIAL TURNTABLE CONSOLE & LID
The aerial turntable console and lid shall be painted with black ruggedized material.

SCOTCHLITE STRIPE
There shall be a 4" wide Scotchlite stripe, with an additional 1" wide stripe located above and below. The stripes shall be located no higher than 60" from the ground installed on the apparatus cab and body. The stripes shall cover a minimum of 60% of each side of the apparatus and 40% of the front and rear of the apparatus. The stripe shall be installed to meet the current NFPA requirements. The striping shall be black in color. The pin/secondary stripe shall be black in color. The reflective stripe shall run straight from the headlights to the rear of the body on each side of the apparatus.

STRIPE, REAR CHEVERON
A minimum of fifty percent of the rear vertical surface of the unit shall be overlaid with a reflective material, installed in an alternating "Chevron" pattern (sloping down and away from the centerline) at a 45° angle. Each stripe shall be 6” wide and the colors of stripping shall be in

compliance, with the current edition of NFPA 1901. The Chevron striping shall be 3M red and lime green.

LETTERING
There shall be a maximum of 60 3" tall Spun Gold letters applied to the apparatus. The lettering shall also have a one color shade applied and shall be determined at pre-construction meeting.

LETTERING, AERIAL BANNER PLATES
There shall be 46 letters applied to the aerial lettering plates as directed. Lettering color and shading shall be determined by the Fire Department.

WARRANTY, BODY PARTS & LABOR
There shall be a two year body mechanical parts and labor warranty provided with the apparatus. The apparatus shall be free of defects in material and workmanship for a warranty period of two years after the date on which the apparatus is first delivered to the original purchaser.

WARRANTY, CAB/CHASSIS PARTS & LABOR
The manufacturer shall provide a limited parts and labor warranty to the purchaser of the cab and chassis for a period of two years or 24,000 miles, whichever occurs first. The warranty period shall commence on the date the vehicle is delivered to the end user.

WARRANTY, CAB STRUCTURAL
The cab structure shall be warranted for a period of ten years or 100,000 miles which ever may occur first. The warranty period shall commence on the date the vehicle is delivered to the end user.

WARRANTY, BODY STRUCTURAL
There shall be a ten year body warranty on each new fire body/heavy-duty rescue apparatus. The bodies are to be free of structural failures caused by defective design or workmanship for a warranty period of ten years after the date on which the vehicle is first delivered to the original purchaser or 100,000 miles, whichever occurs first.

WARRANTY, BODY PAINT/CORROSION
The apparatus manufacturer shall provide a ten year non pro-rated paint and corrosion perforation warranty for the cab and body. This warranty shall cover paint peeling, cracking, blistering, and corrosion provided the vehicle is used in a normal and reasonable manner. The warranty period shall begin upon delivery of the apparatus to the original user-purchaser. A copy of the warranty document shall be provided with the proposal. **No Exceptions.**

WARRANTY, FRAME CORROSION
Lifetime

WARRANTY, FRAME RAIL
The chassis frame and cross members shall be provided with a lifetime material and workmanship limited warranty to the original purchaser. The warranty shall cover the chassis frame and cross members as being free from defects in material and workmanship that would arise under normal use and service. Proposals offering warranties for frames not including cross members shall not be considered.

WARRANTY, MERITOR AXLE

FRONT AXLE - The front axle shall be warranted by Meritor for two years with unlimited miles under the general service application.

REAR AXLE - The rear axle shall be warranted by Meritor for two years with unlimited miles under the general service application.

WARRANTY, DIESEL ENGINE

The Cummins engine shall be warranted for a period of five years or 100,000 miles, whichever occurs first.

WARRANTY, TRANSMISSION

The Allison EVS series transmission shall be warranted for a period of five years with unlimited mileage. Parts and labor shall be included in the warranty.

WARRANTY, ANTI LOCK BRAKE SYSTEM

The ABS brake system shall be warranted for a period of three years or 300,000 miles, whichever occurs first.

WARRANTY, HALE FIRE PUMP

EXPRESS WARRANTY

Hale Products, Incorporated ("Hale") hereby warrants to the original buyer that products manufactured by Hale are free of defects in material and workmanship for a period of five years from the date the product is first placed into service or five and one-half years from date of shipment by Hale, whichever period shall be first to expire. Within this warranty period Hale will cover parts and labor for the first two years and parts only for years three through five.

LIMITATIONS

HALE'S obligation is expressly conditioned on the Product being:

- Subjected to normal use and service
- Properly installed and maintained in accordance with HALE'S Instruction Manual and Industry Standards as to recommended service and procedures
- Not damaged due to abuse, misuse, negligence, or accidental causes
- Not altered, modified, serviced (non-routine), or repaired other than by an Authorized Service facility
- Manufactured per design and specifications submitted by the original buyer
- Used with an appropriate engine as determined by the engine manufacturers published data
- Excluded are normal wear items identified as but not limited to packing, strainers, anodes, filters, light bulbs, intake screens, wear rings, mechanical seals, etc.

WARRANTY, PLUMBING SYSTEM

There shall be a ten year pump plumbing warranty provided. The warranty covers all plumbing components used in construction of the fire apparatus water/foam plumbing system against defects and workmanship, provided the apparatus is used in a normal and reasonable manner. The warranty is extended only to the original user-purchaser for a period of ten years from the date of delivery.

WARRANTY, WATER TANK

The poly tank manufacturer warrants each tank to be free from manufacturing defects in material and workmanship for the service life of the original vehicle (vehicle must be actively used in fire

suppression). The warrant is transferable, with written approval of the manufacturer. Each tank is inspected and tested for leaks prior to leaving the manufacturing facility. The tank shall be installed in the vehicle in accordance to the manufacture's guidelines. There are no warranties, expressed or implied, which extend beyond the description of the face hereof. There is no expressed or implied warranty of merchantability or a warranty of fitness for a particular purpose. Additional, this warranty is in lieu of all other obligations or liabilities on the part of the manufacturer.

MANUAL, CHASSIS OPERATION
There shall be two digital copies of the chassis operation manual provided with the chassis. The digital data shall include a parts list specific to the chassis model.

MANUALS, ENGINE AND TRANSMISSION OPERATION
There shall be two printed hard copy sets of the engine operation manual and two printed hard copy sets of the transmission operation manual specific to the model ordered included with the chassis.

MANUALS, APPARATUS BODY
The contractor shall supply, at time of delivery, at two 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.

MANUALS, FIRE PUMP
There shall be two copies of pump manuals provided to the department.

SAFETY GUIDE
One copy of the latest edition of FAMA's Fire Apparatus Safety Guide shall be provided with the completed apparatus.

WIRING DIAGRAMS, CAB/CHASSIS
There will be a complete digital set of electrical schematics provided at the time of delivery. These schematics will have each circuit properly numbered and in color. The schematic will show each connector in the circuitry and the position in which each circuit enters, exits, or terminates. The schematic will be drawn in such a manner as to allow individual circuitry to be followed throughout the apparatus. These schematics will not have the circuitry condensed into a single line or sets of lines. Multiple sheets will be acceptable so long as each of the harnesses is properly identified to the connecting sheet and harness. There will be a border around the papers, which contain alpha and numeric characters for indexing coordinate reference. There will be an indexing or part reference document for quick location of items shown on the schematics.

WIRING DIAGRAMS, APPARATUS BODY
There will be a complete set of generic electrical schematics provided at the time of delivery. These schematics will have each circuit properly numbered and in color. The schematic will show each connector in the circuitry and the position in which each circuit enters, exits, or terminates. The schematic will be drawn in such a manner as to allow individual circuitry to be followed throughout the apparatus. These schematics will not have the circuitry condensed into a single line or sets of lines. Multiple sheets will be acceptable so long as each of the harnesses is properly identified to the connecting sheet and harness. There will be a border around the paper(s), which contain alpha and numeric characters for indexing coordinate reference. There will be an indexing or part reference document for quick location of items shown on the schematics. This document will refer the user to the appropriate drawing and page number and to

sections of the drawing(s) by the means of letter and number coordinates. The schematic will show all harnesses used in the apparatus cab, chassis and body that is supplied by the chassis and body manufacturer. Modifications to the manufactured standard harnesses are to be documented and properly indexed for quick identification. A complete wire number, color, and function listing will accompany the schematics.

NFPA REQUIRED EQUIPMENT, FD SUPPLIED
The loose equipment as outlined in NFPA 1901, 2016 edition, section 8.8.1 and 8.8.1 shall be provided by the fire department unless it is listed in this proposal. All loose equipment shall be installed on the apparatus before placed in emergency service, unless the fire department waives NFPA section 4.21.

NFPA AERIAL GROUND LADDERS
The aerial apparatus shall be supplied with a full complement of NFPA approved ground ladders.

LADDER, 10' FOLDING
There shall be one Alco-Lite Model FL-10, 10' folding ladder provided with the apparatus. The ladder shall be aluminum, single-section with rubber feet. The ladder shall meet or exceed the latest NFPA standards.

LADDERS, 16' ROOF
There shall be two Alco-Lite model PRL-16, 16' roof ladders supplied with the apparatus. The ladders shall be aluminum, single-section with folding steel roof hooks on one end and steel spikes at the other. The ladders shall meet or exceed the latest NFPA standards.

LADDER, 14' COMBINATION
There shall be one Alco-Lite Model CJL-14, 14' combination ladders supplied with the apparatus. The ladders shall be aluminum with slip resistant safety shoes. The ladders shall meet or exceed the latest NFPA standards.

LADDER, 24' 2-SECTION EXTENSION
There shall be one Alco-Lite model PEL-24, 24' two-section ladders supplied with the apparatus. The extension ladder shall be aluminum with steel spurs on one end. The ladder shall meet or exceed the latest NFPA standards.

LADDER, 35' 3-SECTION EXTENSION
There shall be one Alco-Lite model PEL3-35, 35' three-section ladder supplied with the apparatus. The extension ladder shall be aluminum with steel spurs on one end. The ladder shall meet or exceed the latest NFPA standards.

6' FIBERGLASS PIKE POLES
There shall be two Akron model UL-6, 6' fiberglass pike poles supplied with the apparatus. They shall consist of a 6' hollow fiberglass pole, 1¼" OD with standard steel pike.

8' FIBERGLASS PIKE POLES
There shall be two Akron model UL-8, 8' fiberglass pike poles supplied with the apparatus. They shall consist of an 8' hollow fiberglass pole, 1¼" OD with standard steel pike.

12' FIBERGLASS PIKE POLES
There shall be two Akron model UL-12, 12' fiberglass pike pole(s) supplied with the apparatus. It shall consist of a 12' hollow fiberglass pole, 1¼" OD with standard steel pike.

ROOF HOOKS, NEW YORK
There shall be two Fire Hooks Unlimited model RH-6, 6' New York Roof Hooks supplied with the apparatus. The tools shall be mounted in a location to be determined by the fire department using the appropriate brackets. There shall be two Fire Hooks Unlimited model RH-8, 8' New York Roof Hooks supplied with the apparatus. The tools shall be mounted in a location to be determined by the fire department using the appropriate brackets. There shall be two Fire Hooks Unlimited model W-RH, 10' New York Roof Hook(s) supplied with the apparatus. The tools shall be mounted in a location to be determined by the fire department using the appropriate brackets. The all-purpose head, aircraft steel shaft, chisel end, and Celtex grips makes up this unit. The chisel end is used as a prying tool for scuttle hatches and roof doors.

30° ELBOW - 4" FNST X 5" STORZ
There shall be one Kochek model SKE45R, 4" FNST rocker lug x 5" Storz, adapter supplied with the apparatus. The elbow shall have a 30° turn down.

CAP, 5" STORZ
There shall be one Kochek model CC507, 5" Storz cap with chain provided with the apparatus.

REDUCERS, 2½" FNST X 1½" MNST
There shall be three Kochek model 37RC2515, 2½" FNST x 1½" MNST chrome reducers supplied with the apparatus.

WHEEL CHOCKS WITH BRACKETS
There shall be one pair of Ziamatic model SAC-44 folding wheel chocks with SQCH-44-H horizontal chock holders mounted on the apparatus body as directed by the fire department.

POMPIER BELTS
There shall be four standard life belts, with pompier hook, supplied with the apparatus.

TOOL MOUNTING BRACKET(S), PAC TRAC 1004
Twelve Pac Trac model 1004 tool mounting bracket(s) shall be provided and installed on the apparatus as directed by the Fire Department. The Handlelok brackets provides an adjustable positive locking method to secure axes, hammers, bars and many other tools and equipment. The STRETCHLOK strap allows instant release and is rated at 5,400 PSI tensile strength. The Handlelok grip range shall be 1/8" to 1¾". The Handlelok features includes soft textured pad for extra grip, weather/UV resistant and non-conductive.

FIRE EXTINGUISHERS
One Ansul 20# ABC Dry-Chemical, One Ansul 15# CO2, and One Ansul 2.5 Gallon Water Extinguisher

IDENTIFICATION TAGS/LABELS
All labels and tags mounted to the apparatus must be done in a manner that will ensure their permanent attachment. No automotive-style tape shall be used.

LOOSE EQUIPMENT AND MOUNTING
The fire department will furnish the fire-band radio and mounting location. Loose tool mounting (flashlights, chargers, etc) locations shall be determined at the pre-construction conference.

CAB ROLLOVER PROTECTION SYSTEM
An occupant protection system shall be provided to protect the driver, officer, and crew areas from bodily injury due to a rollover.

VEHICLE STABILITY

The height of the fully loaded vehicle's center of gravity will not exceed the chassis manufacturer maximum. The front to rear weight distribution of the fully loaded vehicle will be within the limits set by the chassis manufacturer. The front axle loads will not be less than the minimum axle loads specified by the chassis manufacturer, under full load and all other loading conditions. The difference in weight on the end of each axle, from side to side, when the vehicle is fully loaded and equipped shall not exceed 7%.

PERFORMANCE TEST AND REQUIREMENTS

The apparatus will meet the performance requirements at elevations of 2,000 feet above sea level. The apparatus will meet the performance requirements while stationary on any grade of up to and including 6% in any direction. From a standing start, the vehicle will attain a true speed of 35 MPH, within 25 seconds on a level road. The apparatus will obtain a minimum top speed of 50 MPH on a level road. The apparatus will be able to maintain a speed of at least 20 MPH, on any grade up to and including 6%. The apparatus will be tested and approved by Underwriters Laboratories Incorporated in accordance with the standard practices for pumping engines.

ROAD TEST

Each manufacturer will conduct road test to verify that the complete apparatus is capable of compliance. The test will be conducted on a dry, level, paved road that is in good condition. The engine will not operate in excess of the maximum no load governed speed. Acceleration test will consist of two runs in opposite direction over the same route. The vehicle will attain a true speed of 35 MPH from a standing start within 25 seconds. The vehicle will attain a minimum top speed of not less than 50 MPH. If the apparatus is equipped with an auxiliary braking system, the apparatus manufacturers will road test the system to confirm that the system is functioning as intended by the auxiliary braking system manufacturer. The service brakes will bring the fully laden apparatus to a complete stop from an initial speed of 20 MPH in a distance not exceeding 35 feet by actual measurement, on a substantially hard, level surface road that is free of loose material, oil, or grease.

FAILURE TO MEET TEST

In the event the apparatus fails to meet the test requirements of these specifications on the first trials, second trials may be made at the option of the manufacturer within 30 days from the date of the first trials. Such trials will be final and conclusive and failure to comply with changes, as the purchaser may consider necessary to conform to any clause of the specifications within 30 days after notice is given to the manufacturer of such changes will also because of rejection of the apparatus. Permission to keep or store the apparatus in any building owned or occupied by the purchaser or its use with the permission of the manufacturer will not constitute acceptance.

- End of Section –

City of Henderson, Kentucky
Invitation to Bid

Bid Reference No. 16-31

BID PRICING SHEET

Bid Price

(1) Aerial Apparatus, FOB Henderson $_____

Addendum # received _____

Non-Collusive Bid Statement: The undersigned bidder, having fully informed himself regarding the accuracy of the statements made herein, certifies that: (1) The bid has been arrived at by the bidder independently and has been submitted without collusion with, and without any agreement, understanding, or planned common course of action with any other vendor of materials, supplies, equipment, or services described in the bid, designed to limit independent bidding or competition, and (2) The contents of the bid have not been communicated by the bidder or its employees or agents to any person not an employee or agent of the bidder or its surety on any bond furnished with the bid, and will not be communicated by any such person prior to the official opening of the bid.

☐ Delivery time from date of order: _____ days

☐ Substitution list (if any) enclosed

☐ Detailed construction specifications enclosed

☐ Proof of product liability and facility insurance equal to or exceeding $25,000,000.00

TIME OF COMPLETION: The undersigned Bidder proposes and agrees hereby to commence the Work of the Contract Documents on a date specified in a written Notice to Proceed to be issued by the City of Henderson, and shall fully complete manufacturing and deliver the apparatus within ____ calendar days thereafter. If no extensions have been granted, the Bidder further agrees to pay as liquidated damages, the sum of two hundred and fifty dollars ($250.00) for each consecutive day thereafter.

_____
Signature of Authorized Official

_____
Name and Title (printed)

_____
Legal Name of Business

_____
Address

_____
Address

_____
Telephone Number

_____
Date

Affix seal below if bid is by corporation.

This seal was herewith affixed in the presence of:

Signature_____ Title_____

06-01-14F

City of Henderson, Kentucky
Invitation to Bid

Bid Reference No. 16-31

REQUIRED AFFIDAVIT FOR BIDDERS CLAIMING KENTUCKY RESIDENT BIDDER STATUS

The bidder or offeror hereby swears and affirms under penalty of perjury that, in accordance with KRS 45A.494(2), the entity bidding is an individual, partnership, association, corporation, or other business entity that, on the date the contract is first advertised or announced as available for bidding:

1. Is authorized to transact business in the Commonwealth;
2. Has for one year prior to and through the date of advertisement
    a. Filed Kentucky corporate income taxes;
    b. Made payments to the Kentucky unemployment insurance fund established in KRS 341.49; and
    c. Maintained a Kentucky workers' compensation policy in effect.

The City of Henderson reserves the right to request documentation supporting a bidder's claim of resident bidder status. Failure to provide such documentation upon request shall result in disqualification of the bidder or contract termination.

_____ _____
Signature Printed Name

_____ _____
Title Date

Company Name _____

Address _____

_____

_____

Subscribed and sworn to before me by _____ _____
(Affiant) (Title)

of _____ this _____day of _____, 20___.
(Company Name)

_____
Notary Public

[seal of notary] My commission expires: _____