INTENT OF SPECIFICATIONS

It is the intent of these specifications to cover the furnishing and delivery to the purchaser of a complete apparatus equipped as herein specified. With a view to obtaining the best results and the most acceptable apparatus for service in the fire department, these specifications cover the general requirements as to the type of construction, together with certain details as to finish, equipment, and appliances with which the successful bidder must conform. Minor details of construction and materials where not otherwise specified are left to the discretion of the contractor, who shall be solely responsible for the design and construction of all features.

Bids shall only be considered from companies that have an established reputation in the field of fire apparatus construction and have been in business for a minimum of 50 years.

Each bidder shall furnish satisfactory evidence of his ability to construct the apparatus specified, and shall state the location of the factory where the apparatus is to be built. The bidder shall also show that they are in a position to render prompt service and furnish replacement parts for said apparatus.

Aerials containing load ratings and capabilities of the highest level within the respective model class shall be accepted. Bids submitted containing medium duty or light duty aerial ladders shall not be considered as meeting minimum requirements and will automatically be rejected.

CONTRACTOR'S SPECIFICATIONS

Each bid shall be accompanied by a set of "Contractor's Specifications" consisting of a detailed description of the apparatus and equipment proposed and to which the apparatus furnished under contract shall conform.

These specifications shall indicate size, type, model, and make of all component parts and equipment.

The submitted bids shall clearly describe the capabilities of the aerial device. Items such as safety factor certification, horizontal reach, vertical reach, scrub chart information, load capabilities, flow ratings, monitor capabilities, short set capabilities, safety interlock information, estimated completed weight information and other pertinent information shall be either submitted with the bid or readily available if requested.

TIMELY PROPOSALS

It is the bidder's responsibility to see that their proposals arrive on time. Late proposals, facsimiles, e-mails, telegram, or telephone bids shall not be considered.

DRAWINGS

All bid drawings shall be stamped PROPOSAL.

- A total of six (6) packets of 11" x 17" drawings, each packet complete with a single view drawing for each side of the apparatus shall be supplied
- All drawings shall be drawn and printed to an appropriate scale to maximize the size of the apparatus on each 11" x 17" sheet of paper.
- Compartment door opening dimensions shall be shown in each compartment.
- Drawings shall be five (5) views. (left, right, front, rear, top) with the exception of chassis that are not always available as AutoCAD drawings
- Rear plumbing, such as 2-1/2" discharges, rear steamers, and direct tank fills, shall be shown
- Ladders shall be labeled with a letter designation referring to the table for an explanation of the ladder type
- OAL (overall length) in feet and inches - Estimated length shall be rounded up to the nearest inch
- OAH (overall height) in feet and inches - Estimated height shall be rounded up to the nearest inch
- Body dimensions shown - pump house width and front of the body to centerline of the rear axle
- Wheelbase in inches
- Estimated in-service weight
- Turning clearance radius
- Front and rear overhang in inches
- No pump panel or instrument panel controls, discharges or inlets. To be blank and labeled "Pump Panel"
- Water tank outline
- Foam tank(s) fill towers
- Exterior mounted hard suction hose
- Warning lights
- D.O.T. lights
- Generator outline
- No front bumper layout
- Roll up doors will be shown in open position. Lap doors will be shown in the closed position
- Compartment depth break over measurement. The measurement where the compartment switches from full depth to shallow depth
- Angle of approach and departure
- Top view of chassis

Text Block Items

- Chassis model
- Water tank capacity
- Foam tank capacity
- Hose bed capacity in cubic feet
- Total compartment cubic feet
- Drawing box is to read "BID" and utilize the bid number
- Drawings shall be printed on white paper with black ink; blue line drawings will not be acceptable.

PURCHASER'S OBLIGATIONS

The purchaser reserves the right to accept or reject any or all bids on such basis as the purchaser deems to be in its best interest. All bidders shall be advised that the purchaser

is not bound in any manner to automatically accept the lowest bid. The purchaser shall only be obligated to purchase the lowest bid that meets these detailed specifications as closely as possible.

SPECIALIZATION

Due to the complexity of the apparatus proposed, it is the desire of the purchaser to obtain equipment that is built by companies that specialize in the construction of NFPA 1901 compliant aerial devices.

The aerial device shall be engineered and fabricated by a manufacturer with a minimum of 40 years experience in the aerial field. No Exceptions

No prototype devices or aerials without a proven field record shall be acceptable. The aerial device provided shall be of the highest quality available in the industry.

SAFETY REQUIREMENTS

It is required that the bidder shall meet all State and Federal safety standards and laws that are in effect on the date of the bid for the item(s) that are being specified and the particular use for which they are meant.

ACQUAINTANCE WITH SPECIFICATIONS

It is the responsibility of the bidder to review all of the bidding requirements. Failure of a bidder to be acquainted with this information shall not relieve them from any obligations of the bid requirements.

QUALITY AND WORKMANSHIP

The design of the apparatus shall embody the latest approved automotive engineering practices. Experimental designs and methods shall not be acceptable.

The workmanship shall be of the highest quality in its respective field. Special consideration shall be given to the following points: accessibility of the various units that require periodic maintenance, ease of operation (including both pumping and driving), and symmetrical proportions.

Construction shall be rugged and ample safety factors shall be provided to carry loads as specified.

GENERAL CONSTRUCTION

The complete apparatus, assemblies, sub-assemblies, component parts, and so on, shall be designed and constructed with due consideration to the nature and distribution of the load to be sustained and to the general character of the service to which the apparatus is to be subjected when placed in service.

All parts of the apparatus shall be strong enough to withstand the general service under full load. The apparatus shall be so designed that the various parts are readily accessible for lubrication, inspection, adjustment and repair.

The apparatus shall be designed and constructed, and the equipment so mounted, with

due consideration to distribution of the load between the front and rear axles, and side to side loading that all specified equipment, including a full complement of specified ground ladders, full water tank, loose equipment, and firefighters; shall be carried without overloading or damaging the apparatus as per requirements defined in NFPA 1901.

The main apparatus body structure shall have an approximate width of 100" in order to maximize the enclosed compartment space of the apparatus. The 100" wide measurement represents the main body structure measured from the bottom, outermost rear corners of the apparatus body structure. Components affixed or fastened to the apparatus will increase the body width proportionately.

LIABILITY

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

WARRANTY

A copy of the warranties for the chassis, pump, body, paint, water tank, aerial device, waterway, and waterway seals shall be furnished with each bidder's proposal.

INFORMATION REQUIRED UPON DELIVERY

The manufacturer shall supply at the time of delivery at least two copies of a complete operation and maintenance manual covering the completed aerial device as delivered.

Parts manuals, where possible, shall be cross referenced so as to show the actual manufacturer's name, part number and description on all outside purchased parts and fittings that are commercially available.

DESIGN / CONSTRUCTION / TESTING CRITERIA

The following criteria shall be applicable to this specification to the extent specified herein:

- NFPA 1901
- American Society for Testing and Materials (ATSM A-36)
- Society of Automotive Engineers, Inc. (SAE) "SAE Handbook"
- American Welding Society (AWS) AWSO 14.4-77
- American Welding Society (AWS) D1.1 and D1.2.
- American Society of Non-Destructive Testing (ASNT) "ASNT CP-189"
- The aerial ladder shall be designed, fabricated, and tested in accordance with the above codes and specifications, as well as all other applicable codes, standards, and specifications that may be referenced by any of the above.

NON-DESTRUCTIVE TESTING

Steel ladders, turntable, stabilizers, and torque box shall have 100% of all welds tested using both magnetic particle method and visual testing method. Aerials that are fabricated of aluminum shall have 100% of all welds tested using dye penetrant method and visual method. All testing shall be performed by certified technicians, which are employees of an independent nationally recognized and certified third party testing

company. Manufacturers who rely on visual inspection (either in-house or by a third party) as the primary method of testing, and magnetic particle or dye penetrant as a secondary or "proving" test method for only suspect areas shall not be acceptable. In any case, welds shall be tested using two (2) separate NDT inspection methods regardless of the material used to construct the aerial device.

THIRD PARTY CERTIFICATION

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 minimum 2 to 1 safety factor specified by NFPA 1901. Devices that have not been certified by a third party engineering firm that is independent of the manufacturer shall not be acceptable. No Exceptions

AERIAL DEVICE SAFETY FACTOR AND RATED CAPACITY

The purchaser desires to purchase, using these specifications, an aerial device with a minimum 2.0:1 Safety Factor 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 all requirements and conditions in these specifications. No Exceptions

BID FORMS / SPECIFICATIONS

All bid forms shall be submitted on the attached bid form. The bid form and/or these specifications shall be filled out by checking either the "YES" or "NO" column for each and every section/paragraph. Failure to use this form and/or these specifications shall be cause for immediate rejection of any bid.

EXCEPTION TO SPECIFICATIONS

The following chassis, pump, and body specifications shall be strictly adhered to. Exceptions shall be allowed if they are equal to or superior to that specified (as judged by the customer), and provided they are listed and fully explained on a separate page entitled "EXCEPTIONS TO SPECIFICATIONS". Exception lists shall refer to the specification page number. Each check in the "NO" column shall be listed and fully explained. Where no check is made in a particular paragraph either "YES" or "NO", it shall be assumed the bidder is taking exception to that paragraph. If a paragraph contains an empty column, where the bidder neglected to check the proper "YES" or "NO" column, it is assumed the bidder is not conforming to the requirements of this paragraph. If no explanation is given in the "EXCEPTIONS TO SPECIFICATIONS" document, the bid is subject to immediate rejection.

PROPOSALS TAKING TOTAL EXCEPTION TO THESE SPECIFICATIONS WILL BE IMMEDIATELY REJECTED.

The buyer is aware that all bidders shall have to take some exceptions therefore; BIDDERS THAT TAKE NO EXCEPTIONS shall BE REQUIRED TO MEET EVERY PARAGRAPH TO THE FULLEST EXTENT SHOULD THEIR BID BE ACCEPTED. It is the intent of the purchaser to receive bids that do not require telephone calls or other communications to ascertain what a bidder is intending to supply.

Upon delivery, the apparatus shall be inspected against THESE specifications and not

those supplied by the bidder with their proposal. Deviations shall not be acceptable unless they were noted as exceptions at the time of bid and the apparatus shall be rejected until said deviations are corrected to the satisfaction of the buyer.

Decisions regarding equal to or better than, shall be the sole responsibility of the recipient of the bids rather than those companies submitting bids. All deviations, regardless of significance must be explained in the "EXCEPTIONS TO SPECIFICATIONS" section of the bid.

When exceptions are not taken but inconsistencies are noted in the submitted detailed specifications, the bid may be subject to rejection.

ROADABILITY

The apparatus, when fully equipped and loaded, shall be capable of the following performance while on dry paved roads that are in good condition:

- Accelerating from 0 to 35 mph (55km/hr) within 25 seconds on a 0 percent grade.
- Attaining a speed of 50 mph (80 km/hr) on 0 percent grade.
- Maintaining a speed of at least 20 mph (32 km/hr) on any grade up to and including 6 percent.
- The maximum top speed of the apparatus shall not exceed the tire manufacturer's maximum speed rating for the tires installed on the apparatus.

FAILURE TO MEET TESTS

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 bidder within 30 days of the date of the first trials.

Such trials shall be final and conclusive and failure to comply with these requirements shall be cause for rejection. Failure to comply with changes as required to conform to any clause of the specifications within 30 days after notice is given to the bidder of such changes, shall be cause for rejection of the apparatus.

Permission to keep or store the apparatus in any building owned or occupied by the Department during the specified period, with the permission of the bidder, shall not constitute acceptance. No Exceptions

PROPOSAL SEQUENCE

Bid specifications shall be submitted in the same sequence as these specifications for ease of checking compliance. There shall be no exceptions allowed to this requirement. The apparatus committee intends to be thorough during the evaluation of bids process. In order to maximize efficiency and minimize the time it takes to thoroughly evaluate all received bids this requirement must be strictly adhered to.

AWARD OF CONTRACT

All bids submitted shall be good for a minimum of 30 days during which time bid securities submitted with the proposals shall be held by the purchaser. Criteria for the award shall include, but not be limited to, the following:

- Apparatus Performance And Safety Levels / Considerations
- Completeness of proposal
- Accuracy of accompanying data
- Past performance of bidder
- Compliance with the detailed specifications
- Compliance with purchasers request(s) for personnel qualifications or certifications
- Exceptions and clarifications
- Financial stability of bidder
- Local representation of the manufacturer
- Serviceability of the proposed apparatus
- Service capabilities of the bidder's local representative
- Compliance with NFPA 1901
- Any other factor the purchaser deems relevant

After the evaluation and award process is complete, all bidders shall be notified of the results and securities shall be returned.

PREREQUISITE BIDDING REQUIREMENTS

Any manufacturer submitting a proposal or bid, to these specifications, shall meet the following conditions:

- The manufacturer of the apparatus herein specified, shall be wholly owned (100%) and managed by a Company, Corporation, and/or Parent Company that is wholly based and permanently resides in the United States of America.
- The Company, Corporation, and/or Parent Company, and all assets belonging to such, shall be wholly owned and managed (100%) by the entities specified above
- Any proposal, bid, or response to these specifications by any foreign based, owned, or managed (in part or in whole) Company, Corporation, and/or Parent Company shall be cause for immediate rejection.
- Any proposal, bid, or response to these specifications by any Company, Corporation, and/or Parent Company, that is owned, operated, managed, or held in contract, in part or wholly by a partnership or other agreement, shall be cause for immediate rejection.

Exceptions to these conditions will not be allowed under any circumstances.

NFPA 1901-2016

The National Fire Protection Association "Standard for Automotive Fire Apparatus", 2016 edition, is hereby adopted and made a part of these specifications, the same as if it were written out in full detail, with the exception of the section dealing with "Equipment Recommended for Various Types of Apparatus". Bidders shall provide the equipment requested herein and the buyer shall supply the rest before the apparatus is put into service. It is the intent of the purchaser to purchase an apparatus that meets 100% of the minimum standards defined and outlined in NFPA 1901-2016 edition. There are to be no exceptions to this requirement.

INSPECTION CERTIFICATE - NFPA 1901 COMPLIANCE

An OEM inspection certificate for the apparatus shall be furnished upon delivery. 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 manufacturer.

The following objectives shall be achieved as a result (this listing shall not be construed

as being all inclusive):

- Ensure that understanding of all parties respective responsibilities have been addressed by the actual referencing of NFPA 1901 and the amendments in these specifications and the purchase contract and documentation.
- Ensure that only structural materials complying with appropriate standards and codes are used for construction.
- Ensure that applicable standards of design and manufacturing have been met or exceeded.
- Ensure that safety factors have been met or exceeded where required.
- Ensure that applicable standards for testing and inspection have been met or exceeded by personnel with the appropriate qualifications, experience, and certifications.
- Ensure that where applicable components, equipment, and loose equipment carry the appropriate characteristics, classifications, and/or certifications.
- Ensure that in general and as a whole, all applicable requirements set forth in NFPA 1901, and those codes, standards, and specifications referenced by said parties are met, exceeded, and/or addressed.

CONSTRUCTION DOCUMENTATION

The contractor shall supply, at the time of delivery, at least one (1) copy of the following documents:

1. The manufacturers record of apparatus construction details, including the following information:

- Owners name and address
- Apparatus manufacturer, model, and serial number
- Chassis make, model, and serial number
- GAWR of front and rear axles
- Front tire size and total rated capacity in pounds or kilograms
- Rear tire size and total rated capacity in pounds or kilograms
- Chassis weight distribution in pounds with water and manufacturer mounted equipment (front and rear)
- Engine make, model, serial number, rated horsepower and 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
- If applicable, the pump make, model, rated capacity in gallons or liters per minute, and serial number
- Pump transmission make, model, serial number, and gear ratio, if unit is equipped with a pump
- If applicable, the auxiliary pump make, model, rated capacity in gallons or liters per minute, and serial number
- Water tank certified capacity in gallons or liters
- On aerial apparatus, the device type, rated vertical height in feet or meters, rated horizontal reach in feet or meters, and rated capacity in pounds or 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, a copy of the following shall be provided: pump manufacturers certification of suction capability, apparatus manufacturers approval for stationary pumping applications, engine manufacturers certified brake horsepower curve showing the maximum governed speed, pump manufacturers certification of the hydrostatic test, and the certification of inspection and test for the fire pump

4. If the apparatus has an aerial device, the certification of inspection and test for the aerial device, and all the technical information required for inspections to comply with NFPA 1914, Standard for Testing Fire Department Aerial Devices

5. If the apparatus has a fixed line voltage power source, the certification of the test for the fixed power source

6. If the apparatus is equipped with an air system, test results of the air quality, the SCBA fill station, and the air system installation

7. 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)

8. Written load analysis and results of the electrical system performance tests

9. When the apparatus is equipped with a water tank, the certification of water tank capacity

OPERATION AND SERVICE DOCUMENTATION

The contractor shall supply, at time of delivery, at least two (2) sets of complete operation and service documentation covering the completed apparatus as delivered and accepted. The documentation shall address at least the inspection, service, and operations of the fire apparatus and all major components thereof. The contractor shall also provide documentation of the following items for the entire apparatus and each major operating system or major component of the apparatus:

- Manufacturers name and address
- Country of manufacturer
- Source of service and technical information
- Parts and replacement information
- Descriptions, specifications, and ratings of the chassis, pump, and aerial device
- Wiring diagrams for low voltage and line voltage systems to include the following information: representations of circuit logic for all electrical components and wiring, circuit identification, connector pin identification, zone location of electrical components, safety interlocks, alternator-battery power distribution circuits, and input/ output assignment sheets or equivalent circuit logic implemented in multiplexing systems
- Lubrication charts
- Operating instructions for the chassis, any major components such as a pump or aerial device, and any auxiliary systems
- Precautions related to multiple configurations of aerial devices, if applicable
- Instructions regarding the frequency and procedure for recommended maintenance
- Overall apparatus operating instructions
- Safety considerations
- Limitations of use
- Inspection procedures
- Recommended service procedures
- Troubleshooting guide
- Apparatus body, chassis, and other component manufacturers warranties
- Special data required by this standard
- Copies of required manufacturer test data or reports, manufacturer certifications, and independent third-party certifications of test results
- A material safety data sheet (MSDS) for any fluid that is specified for use on the apparatus
- One (1) copy of the FAMA Safety Guide

The contractor shall deliver with the apparatus all manufacturers operations and service documents supplied with components and equipment that are installed or supplied by the contractor.

STATEMENT OF EXCEPTIONS

The proposed apparatus as described in this specification document and all related material with the bid package shall meet or exceed all applicable sections for the category of apparatus as defined by NFPA 1901, unless specifically noted within this specification or other official documents associated with this bid.

Should any area, section or portion of the apparatus not meet the intent and applicable requirements, a clearly defined listing or explanation of what and why compliance was not achieved shall be provided to the purchaser at the time of delivery.

OWNER'S MANUAL

There shall be an owner's manual containing the construction, operation, and service documentation provided on a USB Drive. There shall be one (1) copy of the USB provided with the apparatus.

ELECTRICAL MANUAL

A complete electrical manual for the apparatus shall also be provided on the USB Drive. This manual shall be specifically prepared for this individual unit rather than a generic schematic manual designed to accommodate all apparatus. The electrical manual shall also include electrical schematics, harness layouts, V-Mux specifications (including Node Input/output Spreadsheet and Node Relationship Spreadsheet), and Master Wire Listing. A contact letter shall also be provided by the electrical engineer, who built the manual, with instructions on using the manual and contact information for assistance with electrical manual questions.

ELECTRICAL SCHEMATICS

There shall be a section of the electrical manual that shall include schematics of the electrical system and components on the apparatus. These schematics shall be specifically prepared for this individual unit rather than a generic schematic designed to accommodate all apparatus.

PUMP PLUMBING SCHEMATICS (if applicable)

There shall be a section of the electrical manual that shall include a schematic of the pump plumbing. This schematic shall be specifically prepared for this individual unit rather than a generic schematic designed to accommodate all apparatus.

HYDRAULIC SCHEMATICS (if applicable)

There shall be a section of the electrical manual that shall include schematics of the hydraulic components on the apparatus including but not limited to:

- Ladder Rack(s) and Hose Bed Door(s) (if applicable)
- Aerial – Retraction/Extension (if applicable)
- Aerial – Rotation (if applicable)
- Tiller – HVAC Hydraulics System (if applicable)

FIRE APPARATUS SAFETY GUIDE

There shall be one (1) printed copy of the FAMA Fire Apparatus Safety Guide provided with the apparatus. This guide provides safety instructions for operations of the fire apparatus.

AERIAL OPERATION/PARTS/MAINTENANCE MANUALS

There shall be one (1) printed aerial operation and maintenance provided with the apparatus at the time of delivery. These manuals shall be written in a "step by step" format for ease of reference. There shall also be one (1) USB provided with a digital copy of the aerial manuals included with the printed version. Finally, a digital version of the aerial manuals will also be included with the complete Owner's Manual USB for the apparatus.

Information included in the manuals shall include, but no be limited to the following:

1. Manufacturer Defined Terminology; (to help impart full understanding of terminology used in the manuals)
2. Safety Information and Warnings; (to warn of dangerous conditions/personnel injury/equipment damage)
3. Complete Rated Capacities Information; (allowable loads and GPM flows)
4. Complete and Detailed Operating Systems Descriptions; (to impart understanding of operation/capabilities/working principles)
5. Instruction For Manufacturer Recommended Deployment and Operation Of All Systems During All Specific Conditions; (to ensure safer, more efficient operation of the aerial device)
6. Current, Actual Illustrations Of Aerial Components Throughout The Manual; (to aid in location of specific components, being addressed in the manual)
7. Complete Maintenance Instructions/Methods/Materials/Intervals/Inspections.

AERIAL LADDER DEVICE INSTRUCTION - (3) CONSECUTIVE DAYS

A factory trained and authorized instructor shall be on site, at a predetermined date and location, in order to provide fire department personnel the necessary basic instruction for proper, safe operation and maintenance of the aerial ladder and related components of the aerial ladder.

Individual fire departments have their own unique requirements and schedules. The training program recognizes these unique requirements and schedules. Our instruction program is designed to be flexible within reason. Our instructors are willing to negotiate a realistic schedule acceptable to all parties while providing the proper level of training that will allow department personnel the confidence to enhance and expand the training program upon completion of the provided instructional program. The authorized apparatus manufacturer’s instructor shall provide three (3) consecutive days of training.

The instruction period shall consist of a combination of classroom instruction as well as hands-on instruction. The instruction program shall be structured and provide instructions to the users on proper operations as defined by the OEM. The instruction/ demonstration shall cover the following items; this list is not intended to be all-inclusive:

- Aerial ladder rated load capacity/load minder
- Acceptable aerial ladder operational performance parameters and characteristics
- Proper aerial ladder deployment conditions
- Safety during aerial ladder operations
- Aerial ladder device care and maintenance
- Use of the operation and maintenance manuals
- The instruction period and content shall be so designed to provide department personnel with basic fundamental aerial ladder training as recommended by the aerial manufacturer. Training aids utilized by the instructor, which are to be considered in addition to the operations and maintenance manuals, are encouraged.

Upon completion of the training course, all attendees will have been provided the proper instructional training which shall provide the operational knowledge necessary in order to feel comfortable with the aerial operations and continue additional training as set forth by the department training officer.

MISCELLANEOUS EQUIPMENT ALLOWANCE

The Gross Axle Weight Rating (GAWR) and the Gross Combined Weight Rating

(GCWR) or Gross Vehicle Weight Rating (GVWR) of the chassis shall be adequate to carry the weight of the unequipped apparatus with the water tank and other tanks full, specified hose load, unequipped personnel weight, ground ladders, and miscellaneous equipment allowance of 2,500 pounds.

TILT TABLE TESTING NOT REQUIRED

The chassis of the apparatus is equipped with Electronic Stability Control (ESC), which meets the NFPA requirement of maintaining a stability of 26.5 degrees in both directions.

VEHICLE STABILITY

The apparatus shall comply with the requirements of NFPA 1901 as it applies to vehicle stability. The particular apparatus as described in the specification provided within the bid package shall be classified into one of the following categories:

- The apparatus shall go through actual tilt table testing. This shall be determined by the apparatus manufacturer.
- The apparatus shall be equipped with a rollover stability control system as defined in section 4.13.1.2 of NFPA 1901.
- The apparatus shall be deemed a similar apparatus and meeting the intent of section 4.13.1.1.2 of NFPA 1901.

INDEPENDENT THIRD PARTY PUMP CERTIFICATION

The fire pump shall be tested and certified by Underwriter's Laboratories, a nationally recognized independent third party testing company. Tests shall be conducted so that the pump performs as listed below:

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

The entire pump, both suction and discharge passages, shall be hydrostatically tested to a pressure of 600 PSI. The pump shall be fully tested at the pump manufacturer’s factory to the performance spots as outlined by NFPA 1901. The pump shall be free from objectionable pulsation and vibration.

PUMP CERTIFICATION

The pump shall be certified in U.S. gallons per minute (GPM).

APPARATUS PRODUCTION PHOTOS

Photos of the apparatus shall be provided to the customer at regular intervals as it progresses through production. There shall be a minimum of eight (8) photos provided at each of the following intervals:

- Chassis arrival to the OEM
- Each week of production at the OEM
- Upon completion of production

The photos shall be uploaded to a secure website, only accessible to the customer and representatives of the OEM.

PRE-CONSTRUCTION MEETING

There shall be a pre-construction meeting held at the apparatus manufacturer’s factory. Fire department personnel, dealer representative(s) and factory representative(s) shall be present during the pre-construction meeting process. The purpose of conducting this meeting at the factory is to allow the fire department personnel to see various features of or similar components on other apparatus that may be found on the production floor. The pre-construction meeting is the most important meeting during the after-sale production process. The purpose of this meeting is to finalize all aspects of the specifications, discuss and clarify all design details of the apparatus, and to share or provide all information so all parties are in agreement on the apparatus being constructed. The ultimate goal of the pre-construction meeting is for the fire department officials, dealer representative(s), and factory representative(s) to discuss and clarify all aspects of the proposed apparatus and to provide all necessary information to the apparatus manufacturer that will ensure the apparatus is built to the satisfaction of all parties involved.

The apparatus manufacturer shall create and forward to the dealer a "Pre-construction" document containing the following items:

- Complete specifications of the apparatus including the chassis
- Detailed amp draw report
- Listing of clarifications or questions from the manufacturer that require attention (shelf locations, lettering details, etc.)
- A total of six (6) packets of 11" x 17" drawings, each packet complete with a single view drawing for each side of the apparatus shall be supplied
- All drawings shall be drawn and printed to an appropriate scale to maximize the size of the apparatus on each 11" x 17" sheet of paper.

During this pre-construction meeting, any changes or clarifications must be documented on a manufacturer issued change order. The change order shall be signed by the customer and dealership and ultimately by the apparatus manufacturer. The change order becomes an extension of the contract with the official signatures of all three parties. All change order items resulting from the pre-construction meeting shall be implemented into the official shop order document.

FINAL INSPECTION

The customer and/or dealer representative will inspect the final apparatus prior to it leaving the apparatus body manufacturer’s facility. This will allow any changes that may be required, to be done so in a timely and inexpensive manner. After leaving the facility, all repairs or alterations will be performed by either the Dealer or an OEM approved service center.

OVERALL HEIGHT

The actual overall height of the vehicle shall be approximately 143" (11'-11") from the ground. This measurement shall be taken with the tires properly inflated with the apparatus in the unloaded condition. The actual measurement shall be taken at the highest point of the apparatus.

OVERALL LENGTH

The actual overall length of the vehicle shall be approximately 500" (41'-8").

WHEELBASE

The actual wheelbase of the vehicle shall be approximately 225" (18'-9").

ANGLE OF APPROACH

The actual angle of approach of the vehicle shall be a minimum of 11 degrees.

ANGLE OF A DEPARTURE

The actual angle of departure of the vehicle shall be a minimum of 10 degrees.

SMEAL SIRIUS CHASSIS

The chassis shall be a Smeal Sirius.

MUD FLAPS

In addition to the chassis supplied front mud flaps, there shall be two (2) mud flaps provided rearward of the rear axles on the apparatus. The mud flaps shall be a minimum of 3/8" thick to prevent "sailing."

The chassis supplied and installed heat exchanger shall be attached to the pump by the OEM manufacturer.

CHASSIS SUPPLIED FRONT BUMPER

The front bumper shall be chassis supplied and installed.

120V RECEPTACLE

There shall be one (1) NEMA 5-20R, 120 volt, duplex, 3-wire, straight blade (household type) receptacle installed on the apparatus and wired to the shoreline. The receptacle shall have a 20 ampere rating and include a spring loaded weather resistant cover if mounted in an exterior location.

The outlet shall be located behind the driver's seat, inside the chassis cab.

WATER TANK

The apparatus shall be equipped with a United Plastic Fabricating 480 U.S. gallon water tank. Certification of the tank capacity shall be recorded on the manufacturer's record of construction and shall be provided to the purchaser upon delivery of the apparatus. The UPF® water tank shall be constructed of 1/2" thick PT2E™ polypropylene sheet stock. This material shall be a non-corrosive stress relieved thermoplastic, black in color, and U.V. stabilized for maximum protection.

BOOSTER TANK

The booster tank shall be of a specific configuration and shall be so designed to be completely independent of the body and compartments. All joints and seams shall be nitrogen welded and tested for maximum strength and integrity. The top of the booster tank shall be fitted with removable lifting eyes designed with a 3 to 1 safety factor to facilitate easy removal.

TANK BAFFLES

The transverse swash partitions shall be manufactured of 3/8" PT2E™ polypropylene (natural in color) and extend from approximately 4" off the floor to just under the cover. The longitudinal swash partitions shall be constructed of 3/8" PT2E polypropylene (natural in color) and extend to the floor of the tank through the cover to allow for positive welding and maximum integrity. 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 shall interlock with one another and be welded to each other as well as to the walls of the tank.

TANK SUMP

There shall be one (1) sump in the bottom of the water tank. The sump shall be constructed of 1/2" polypropylene and shall be located in the left front quarter of the tank. On all tanks that require a front suction, a 4" schedule 40 polypropylene pipe shall be installed that will incorporate a dip tube from the front of the tank to the sump location. The sump shall be used as a combination clean-out and drain. All tanks shall have an anti-swirl plate located approximately 2" above the sump to pre-vent air from being entrained in the water while pumping.

TANK FILL CONNECTION

All tank fill couplings shall be backed with flow deflectors to break up the stream of water entering the tank, and shall be capable of withstanding sustained fill rates of up to 1,000 GPM.

TANK LID

The tank lid shall be constructed of 1/2" thick PT2E™ polypropylene to incorporate a multi three-piece locking design that allows for individual removal and inspection if necessary. The tank lid shall be recessed 3/8" from the top of the tank and shall be welded to both sides and longitudinal partitions for maximum integrity. Each one of the lids shall have hold downs consisting of 2" polypropylene dowels spaced a maximum of 30" 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 be drilled and tapped 1/2" x 13" to accommodate the lifting eyes.

WATER TANK MOUNTING

The tank carrier shall be designed specifically for this apparatus. The carrier structure shall be supported by and welded directly to the top plate of the torque-box.

WATER TANK DRAIN

There shall be a 1-1/2" drain valve provided in the pump compartment to drain the water tank.

WATER TANK FILL TOWER

The tank shall have a combination vent and manual fill tower marked "Water Fill." The fill tower shall be constructed of 1/2" PT2E™ polypropylene and shall be a minimum dimension of 8" x 8" at the outer perimeter. The tower shall be located in the left front

corner of the tank. The tower shall have a 1/4" thick removable polypropylene screen and a PT2E™ polypropylene hinged-type cover. The fill tower shall be blue in color.

WATER TANK LEVEL GAUGE

There shall be one (1) Innovative Controls SL Plus Tank Level Monitor System provided on the pump operator's control panel. The system shall include one (1) electronic display module(s), a stainless steel pressure transducer sender unit, and the necessary wiring with water-tight plug terminations that do not require sealing grease.

The master display module shall show the tank level using 16 super-bright easy-to-see LEDs. Tank level indication shall be achieved by the appropriate illumination of 4 horizontal rows of LEDs, with 4 LEDs per row. Full and near-full levels shall be indicated with the illumination of all 4 rows of LEDs, including the illumination of the top row of 4 green LEDs. Tank levels between ½ and ¾ full shall be indicated with the illumination of the bottom 3 rows of LEDs, including the illumination of the top row of 4 blue LEDs. Tank levels between ¼ and ½ full shall be indicated with the illumination of the bottom 2 rows of LEDs, including the illumination of the top row of 4 amber LEDs. Tank levels between ¼ full and near empty shall be indicated with the illumination of the bottom row of 4 red LEDs only. Tank levels between near empty and empty shall be indicated by flashing the bottom row of 4 red LEDs.

The master display shall have a backlit area above at the top with illuminated water icon and a backlit area at the bottom with illuminated OEM logo.

A wide-angle polycarbonate diffusion lens in front of the LEDs shall produce a 180° viewing angle. The electronic display module shall be waterproof and shock resistant being encapsulated in a urethane-based potting compound. The potted display electronics shall be integral to a chrome-plated panel-mount reflector that is secured to the apparatus panel with 4 screws installed from the inside of the panel.

All programming functions shall be accessed and performed from the front of the installed master display module with a magnet. The programming shall include manual or self-calibration for any style tank.

4" WATER TANK OVERFLOW

The tank shall be equipped with a minimum of a 4" schedule 40 polypropylene overflow/ air vent pipe. The pipe shall be installed in the fill tower and extend through the tank and dump to the rear of the rear axle.

FOAM CELL

There shall be one (1) United Plastic Fabricating 20 U.S. gallon foam cell incorporated into the water tank. There shall be one (1) pressure/vacuum vent installed on the foam tank. There shall be one (1) drain hose connected to the foam cell. The drain shall have a quarter-turn valve installed inside the pump compartment and it shall drain below the frame rail of the chassis.

Class "A" foam shall be utilized.

The foam tank shall have a manual fill tower. The fill tower shall be constructed of 1/2" PT3™ polypropylene and shall be a minimum dimension of 8" x 8" outer perimeter. Each foam fill tower shall be constructed of a green colored material 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 1/4" thick removable polypropylene screen and a stainless steel hinged-type cover. Inside the fill tower, approximately 1.5” 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.

No Foam Tank Level Gauge

HOSE BED - ERGONOMIC HOSE LOAD (EHL)

There shall be storage capacity for a minimum of 1,000 feet of 5" double-jacket or rubber, large diameter fire hose in 100' lengths. For ease of operation, accessibility and safety the hose bed storage area shall be located within the enclosed torque box. Access to the stored hose shall be at the rear center area of the apparatus. Because of safety concerns, designs that require department personnel to climb on the apparatus to reload hose into the hose bed area, or that utilize hose chutes in the design shall not be acceptable.

The hose shall be stored in a storage box specifically designed for ease of operation and maximum safety. The hose box shall be located within the torque box when the apparatus is in the road condition. The storage box shall contain a bottom floor, two sidewalls, and a front wall. For rapid ease of unloading hose, there shall be no rear wall. The hose storage structure shall contain a mechanical means that shall extend and lower the storage box out the rear of the truck for ease of loading the hose. Once reloading operations have been completed the structure shall raise and retract into the bedded condition.

The aerial hydraulic pump shall be the power source for the mechanical operational functions of the storage box system. The operational control shall consist of an electric switch that shall be located on the rear of the apparatus for ease of operation. When the box is fully extended and lowered to the reload position the box shall extend out the rear of the apparatus approximately 12' 6". For ease of reloading hose, the top portion of the storage box shall be no higher than 50" from ground level when in the re-load position while on flat terrain. A hydraulic motor pinion gear assembly shall be utilized for the extension/retraction function. One hydraulic cylinder shall be utilized for the lowering/ raising function. Provisions shall allow for this system to be manually positioned to the travel position should a mechanical malfunction occur.

The extending substructure shall consist of heavy-duty steel structural members. The storage box shall be fabricated from 3/16" aluminum. The approximate dimensions shall be 144" long x 15-1/2" high x 32" wide. Drain holes shall be located in the bottom of the aluminum storage box. The interior of the hose bed shall be coated with Line-X®, a thermoplastic polyurethane coating. The coating shall be black in color.

Two flashing warning lights shall be installed, one (1) each side on the end of the substructure tubes that alert personnel of the deployed position of the hose box structure. An aluminum side safety shield shall be installed designed to keep items from being caught and damaged when the structure is being lowered and raised. There shall be a 4" white reflective striping affixed to the safety shield to alert motorist during night operation.

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. The system shall be designed in such a manner as to only allow activation of the down function after full-extension has been reached. The retraction function cannot be activated until the maximum upward travel has been reached.

The EHL system shall include a warning light in the cab specifically to warn the driver that the EHL structure is not in the stored position. The inside, upper portion of the torque box area shall be free of items that may cause interference with the rapid deployment of the hose. The design shall ensure that hose couplers do not bind up or get caught up during the deployment operation.

The floor of the hose bed storage box shall be constructed of Dura-Dek, a reinforced plastic material. The flooring shall be fabricated of "T" beam pultrusions in parallel connected with cross slats that are first mechanically bonded and then epoxied, forming a large sheet. The top portion of each "T" cross section shall measure 1 1/4" wide and 3/16" thick with beaded ends. The vertical portion shall be 3/8" thick, beading out at the bottom to a thickness of 1/2" and tall enough to result in an overall height of 1". The "T" sections shall be spaced 3/4" apart to allow for drainage and ventilation.

Each "T" beam shall be constructed utilizing a core of 250,000 continuous glass fiber strands that are high in resistance to tension, compression, and bending. An outer sheath consisting of a continuous strand mat to prevent linear splitting shall surround the core. The sheath shall also serve to draw the protective resin to the bar surface. Both reinforcements shall be pulled through an isophthalic polyester resin, treated with antimony trioxide for fire resistance to form a solid length.

The flooring shall then be protected with a polyurethane coating to screen out ultraviolet rays. This bright white coating shall be baked on and provide a pleasing contrast when it is installed in the apparatus.

The hose bed shall contain the following hose load:

1000' of 5" double jacket hose

ALUMINUM BODY CONSTRUCTION

The apparatus body shall be fabricated from 1/8" 5052-H32, smooth aluminum sheet. The total outside width of the apparatus body shall not exceed 100 inches (2.54 meters). The width measurement of the sidewalls shall be made from the outside wall of the two opposite sides of the body.

The complete apparatus body shall be fabricated utilizing the break and bend techniques in order to form a strong, yet flexible, uni-body structure. The body shall be constructed with holding fixtures to ensure proper dimensioning. Each apparatus body is specific in design in order to meet the unique requirements of the purchasing fire department.

The main body compartments on each side, as well as the rear center compartment if applicable, shall contain a sweep out floor design. Each compartment shall be made to the most practical dimensions in order to provide maximum storage capacity for the fire department's equipment. The door opening threshold shall be positioned lower than the compartment floor permitting easy cleaning of the compartments.

Continuous, solid welded seams shall be located at the upper front and upper rear corners of the apparatus body. The flooring of all lower, main body compartmentation shall also have solid weld seams. All door jams, on both the top and the bottom, shall be solid welded as well. Each main door jam consists of a double jam design; this is comparable to a double struck frame design, which provides superior strength and durability. All double door jams are to be welded together utilizing the plug weld technique. All remaining compartment walls shall be stitch welded.

The compartment floors, specifically L1 and R1, shall have a minimum of two (2) 1" x 2" rectangular tubes welded to the entire width of the compartment floor. The two (2) rear side compartments as well as the rear center compartment, if applicable, shall be welded to the rear deck support structure. This rear deck support structure is specially designed for the galvanized apparatus body substructure. A minimum of two (2) squares tubes, which are 1/4" x 3" x 3", shall run the entire width of the body from sidewall to sidewall. Each lower, rear compartment shall be adequately stitch welded to the cross tubes providing strength and durability to the entire apparatus body.

The body design shall include a "false wall" design in the lower portion of each lower, rear compartment. This "false wall" is required in order to allow for easy accessibility to the rear electrical components found in the rear tail light cluster area.

On the upper area of the apparatus body, directly above the side compartment door openings, a header is to be fabricated from smooth, aluminum sheet. This area shall be free from any body seams and shall be painted the same color as the apparatus body. The height of the header may vary depending on the following factors: apparatus design, lettering requirements, scene lights and warning light requirements as well as various other options. A "J" channel shall be incorporated into the body design in order to provide a rain gutter to further assist in preventing excessive moisture from getting into the compartments.

There shall be ten (10) ROM rollup door installed, one (1) on each side body compartment face. Each door shall be a shutter type with 34 millimeter slats that roll onto a spool at the top of each compartment. Each slat shall be equipped with nylon end shoes to assure operation without the need of constant lubrication. The door slats, tracks, and bottom sill shall be wet painted by the door manufacturer to match the apparatus body.

Each ROM rollup door shall be supplied with a full width lift bar and finger pull handle integrated into the bottom rail for easy one hand operation.

The door handles on the side body compartments of the apparatus shall be non-locking style.

There shall be one (1) horizontally hinged lap type compartment door installed on the compartment face. The lap door shall be a single panel construction and fabricated of aluminum. The door shall be painted job color. The edges of the door shall be formed to an inward angle for added rigidity. There shall be rubber molding installed in the overlap area of the door to insure a weatherproof seal and prevent water from collecting in the door sill. The compartment door shall have a polished stainless steel continuous hinge with a rubber seal installed between the hinge and the aluminum door to separate the dissimilar metals. The hinge pin shall be stainless steel with a minimum diameter of 1/4".

The compartment door handle shall be a non locking stainless steel grab handle.

There shall be two (2) pressurized gas-filled cylinders furnished on the compartment door. The cylinders shall hold the door in the open position and assist in raising it. The gas filled cylinders shall assist in closing the door automatically when the door is positioned over center.

The compartment shall be adequately lit for nighttime operations.

BODY COMPARTMENT LIGHTING

There shall be a total of thirteen (13) ROM V4 LED compartment lights installed in the body compartments. Each light shall feature solid state construction and be waterproof to IPX7 rating. The V4 LED lights shall offer 250 lumens per foot of lighting.

COMPARTMENT COATING

The interior of the body compartments shall be coated with gray Line-X®. thermoplastic polyurethane coating, unless otherwise specified. The coating shall be durable enough to withstand the everyday abuse of equipment removal and shifting.

DRI-DEK TILES

There shall be Dri-Dek interlocking squares in all of the body compartments. The Dri-Dek shall be applied in floor-mounted trays and on compartment floors that do not contain floor-mounted trays. No Dri-Dek shall be applied on compartment floors underneath floor-mounted trays. Each square shall be made from polyvinyl chloride that is flame and chemical resistant. For maximum slip resistance and drainage, each square shall have a knobby perforated surface.

COMPARTMENT AIR RELEASE

Each compartment shall be vented to help remove trapped air when closing a compartment door. The vent shall be a rubber gasket in the area of the outboard corners of the compartment. Wiring may also be run through these areas.

COMPARTMENT DRAIN HOLES

Each body compartment shall be equipped with drain holes to allow standing water to exit to underneath the apparatus.

FUEL FILLS

There shall be a fuel fill pocket located in the rear wheel well area on driver's side. The fuel fill shall utilize a stainless steel OEM door that is painted primary body color. The hinge and frame shall all be constructed out of stainless steel material.

DRIVER'S (LEFT) SIDE BODY COMPARTMENTS

COMPARTMENT L1
There shall be a full height compartment located ahead of the rear wheels on the driver's side of the apparatus body. This compartment shall be designated as L1 within these specifications and any ensuing paperwork or drawings after contract execution.

The dimensions of the compartment shall be:
Height: 57"

Width: 23"
Depth: 14" Upper and 23" Lower
Intermediate Divide Height: 30"

COMPARTMENT L2
There shall be a standard height compartment located above the rear wheels on the driver's side of the apparatus body. This compartment shall be designated as L2 within these specifications and any ensuing paperwork or drawings after contract execution.

The dimensions of the compartment shall be:
Height: 24"
Width: 35"
Depth: 14" Upper and " Lower
Intermediate Divide Height: "

COMPARTMENT L3
There shall be a standard height compartment located above the rear wheels on the driver's side of the apparatus body. This compartment shall be designated as L3 within these specifications and any ensuing paperwork or drawings after contract execution.

The dimensions of the compartment shall be:
Height: 24"
Width: 35"
Depth: 14" Upper and " Lower
Intermediate Divide Height: "

COMPARTMENT L4
There shall be a standard height compartment located above the rear wheels on the driver's side of the apparatus body. This compartment shall be designated as L4 within these specifications and any ensuing paperwork or drawings after contract execution.

The dimensions of the compartment shall be:
Height: 18"
Width: 51"
Depth: 14" Upper and " Lower
Intermediate Divide Height: "

COMPARTMENT L5
There shall be a full height compartment located behind the rear wheels on the driver's side of the apparatus body. This compartment shall be designated as L5 within these specifications and any ensuing paperwork or drawings after contract execution.

The dimensions of the compartment shall be:
Height: 49"
Width: 24"
Depth: 14" Upper and 24" Lower
Intermediate Divide Height: 25"

L1 Components

There shall be one (1) roll out equipment tray installed on the floor of the compartment. The tray shall be equipped with an Austin Hardware drawer slide. The roller assembly shall have a rated capacity of 300 lbs. distributed load and shall have 100% extension

capability. The tray shall be constructed of 3/16" aluminum sheet with 3" lips to prevent items from being shifted during transportation. The tray shall be equipped with the Austin Hardware front drawer release system, which allows for one handed latch closed position release. The tray shall have an abraded finish and shall be equipped with a locking slide in order to hold the tray in either a fully extended or closed position.

There shall be aluminum vertical strut channels welded in the compartment. There shall be two (2) struts for any full depth portion and one (1) strut for any shallow depth portion, on each side of the compartment.

The compartment layout shall be detailed at the pre-construction meeting.

L2 Components

There shall be aluminum vertical strut channels welded in the compartment. There shall be two (2) struts for any full depth portion and one (1) strut for any shallow depth portion, on each side of the compartment.

The compartment layout shall be detailed at the pre-construction meeting.

L3 Components

There shall be aluminum vertical strut channels welded in the compartment. There shall be two (2) struts for any full depth portion and one (1) strut for any shallow depth portion, on each side of the compartment.

The compartment layout shall be detailed at the pre-construction meeting.

L4 Components

There shall be aluminum vertical strut channels welded in the compartment. There shall be two (2) struts for any full depth portion and one (1) strut for any shallow depth portion, on each side of the compartment.

The compartment layout shall be detailed at the pre-construction meeting.

L5 Components

There shall be aluminum vertical strut channels welded in the compartment. There shall be two (2) struts for any full depth portion and one (1) strut for any shallow depth portion, on each side of the compartment.

The compartment layout shall be detailed at the pre-construction meeting.

DRIVER'S SIDE REAR WHEEL WELL POSITION - WL1

There shall be a single air bottle compartment installed in the forward portion of the rear wheel well area, on the driver's side. The compartment door and hinges shall be constructed out of stainless steel material, and the frame shall be constructed out of aluminum. The door shall have a rubber gasket in order to create a 100% seal to protect the interior of the compartment. The storage compartment shall be a rotational, molded component that is assembled to the door and frame. This assembly process shall prevent the air bottle from making contact with the stainless steel frame while loading and unloading the air bottle. The door shall be painted primary body color.

DRIVER'S SIDE REAR WHEEL WELL POSITION - WL2

There shall be two (2) single air bottle compartments installed in the rear wheel well area, between the tandem axles. Each compartment door and hinges shall be constructed out of stainless steel material, and the frame shall be constructed out of aluminum. The doors shall have a rubber gasket in order to create a 100% seal to protect the interior of the compartment. The storage compartments shall be a rotational, molded component that is assembled to the door and frame. This assembly process shall prevent the air bottle from making contact with the stainless steel frame while loading and unloading the air bottle. The doors shall be painted primary body color.

DRIVER'S SIDE REAR WHEEL WELL POSITION - WL3

There shall be a single air bottle compartment installed in the rearward portion of the rear wheel well area, on the driver's side. The compartment door and hinges shall be constructed out of stainless steel material, and the frame shall be constructed out of aluminum. The door shall have a rubber gasket in order to create a 100% seal to protect the interior of the compartment. The storage compartment shall be a rotational, molded component that is assembled to the door and frame. This assembly process shall prevent the air bottle from making contact with the stainless steel frame while loading and unloading the air bottle. The door shall be painted primary body color.

OFFICER'S (RIGHT) SIDE BODY COMPARTMENTS

COMPARTMENT R1
There shall be a full height compartment located ahead of the rear wheels on the officer's side of the apparatus body. This compartment shall be designated as R1 within these specifications and any ensuing paperwork or drawings after contract execution.

The dimensions of the compartment shall be:
Height: 57"
Width: 23"
Depth: 14" Upper and " Lower
Intermediate Divide Height: "

COMPARTMENT R2
There shall be a standard height compartment located above the rear wheels on the officer's side of the apparatus body. This compartment shall be designated as R2 within these specifications and any ensuing paperwork or drawings after contract execution.

The dimensions of the compartment shall be:
Height: 24"
Width: 35"
Depth: 14" Upper and " Lower
Intermediate Divide Height: "

COMPARTMENT R3
There shall be a standard height compartment located above the rear wheels on the officer's side of the apparatus body. This compartment shall be designated as R3 within these specifications and any ensuing paperwork or drawings after contract execution.

The dimensions of the compartment shall be:
Height: 24"
Width: 35"

Depth: 14" Upper and " Lower
Intermediate Divide Height: "

COMPARTMENT R4
There shall be a standard height compartment located above the rear wheels on the officer's side of the apparatus body. This compartment shall be designated as R4 within these specifications and any ensuing paperwork or drawings after contract execution.

The dimensions of the compartment shall be:
Height: 18"
Width: 51"
Depth: 14" Upper and " Lower
Intermediate Divide Height: "

COMPARTMENT R5
There shall be a full height compartment located behind the rear wheels on the officer's side of the apparatus body. This compartment shall be designated as R5 within these specifications and any ensuing paperwork or drawings after contract execution.

The dimensions of the compartment shall be:
Height: 49"
Width: 48"
Depth: 14" Upper and 23" Lower
Intermediate Divide Height: 25"

R1 Components

There shall be aluminum vertical strut channels welded in the compartment. There shall be two (2) struts for any full depth portion and one (1) strut for any shallow depth portion, on each side of the compartment.

The compartment layout shall be detailed at the pre-construction meeting.

R2 Components

There shall be aluminum vertical strut channels welded in the compartment. There shall be two (2) struts for any full depth portion and one (1) strut for any shallow depth portion, on each side of the compartment.

The compartment layout shall be detailed at the pre-construction meeting.

R3 Components

There shall be aluminum vertical strut channels welded in the compartment. There shall be two (2) struts for any full depth portion and one (1) strut for any shallow depth portion, on each side of the compartment.

The compartment layout shall be detailed at the pre-construction meeting.

R4 Components

There shall be aluminum vertical strut channels welded in the compartment. There shall be two (2) struts for any full depth portion and one (1) strut for any shallow depth portion, on each side of the compartment.

The compartment layout shall be detailed at the pre-construction meeting.

R5 Components

There shall be one (1) roll out equipment tray installed on the floor of the compartment. The tray shall be equipped with an Austin Hardware drawer slide. The roller assembly shall have a rated capacity of 300 lbs. distributed load and shall have 100% extension capability. The tray shall be constructed of 3/16" aluminum sheet with 3" lips to prevent items from being shifted during transportation. The tray shall be equipped with the Austin Hardware front drawer release system, which allows for one handed latch closed position release. The tray shall have an abraded finish and shall be equipped with a locking slide in order to hold the tray in either a fully extended or closed position.

There shall be aluminum vertical strut channels welded in the compartment. There shall be two (2) struts for any full depth portion and one (1) strut for any shallow depth portion, on each side of the compartment.

The compartment layout shall be detailed at the pre-construction meeting.

OFFICER'S SIDE REAR WHEEL WELL POSITION - WR1

There shall be a single air bottle compartment installed in the forward portion of the rear wheel well area, on the officer's side. The compartment door and hinges shall be constructed out of stainless steel material, and the frame shall be constructed out of aluminum. The door shall have a rubber gasket in order to create a 100% seal to protect the interior of the compartment. The storage compartment shall be a rotational, molded component that is assembled to the door and frame. This assembly process shall prevent the air bottle from making contact with the stainless steel frame while loading and unloading the air bottle. The door shall be painted primary body color.

OFFICER'S SIDE REAR WHEEL WELL POSITION - WR2

There shall be two (2) single air bottle compartments installed in the rear wheel well area, between the tandem axles. Each compartment door and hinges shall be constructed out of stainless steel material, and the frame shall be constructed out of aluminum. The doors shall have a rubber gasket in order to create a 100% seal to protect the interior of the compartment. The storage compartments shall be a rotational, molded component that is assembled to the door and frame. This assembly process shall prevent the air bottle from making contact with the stainless steel frame while loading and unloading the air bottle. The doors shall be painted primary body color.

OFFICER'S SIDE REAR WHEEL WELL POSITION - WR3

There shall be a single air bottle compartment installed in the rearward portion of the rear wheel well area, on the officer's side. The compartment door and hinges shall be constructed out of stainless steel material, and the frame shall be constructed out of aluminum. The door shall have a rubber gasket in order to create a 100% seal to protect the interior of the compartment. The storage compartment shall be a rotational, molded component that is assembled to the door and frame. This assembly process shall prevent the air bottle from making contact with the stainless steel frame while loading and unloading the air bottle. The door shall be painted primary body color.

REAR BODY COMPARTMENT

There shall be a compartment located at the rear of the apparatus that extends into the apparatus torque box.

BODY SUB FRAME

The main body sub frame shall be constructed from formed steel channel bolted and welded to the torque box. The sub frame shall be located at the front and rear of the body and in front of, above, and rear of the wheel well opening.

The compartment area behind the rear axle shall be supported by a drop frame fabricated of steel tube and angles. All drop frame structures shall be welded directly to the torque box to allow the body to be a completely separate structure from the chassis.

WALKWAYS AND OVERLAYS

All exterior surfaces designated by the manufacturer as stepping, standing, or walking areas shall be overlaid with 3003 H22 Bright Tread Plate to provide a slip resistant surface, even when the surface is wet. All interior surfaces designated by the manufacturer as stepping, standing, or walking areas shall be slip resistant when the surface is dry. The degree of slip resistance shall be in compliance with the intent of NFPA 1901.

Horizontal walkways shall have .080" aluminum tread plate overlays installed and vertical surfaces shall have .125” aluminum overlays. Overlays shall be installed that are totally insulated from the apparatus with nylon shoulder washers that extend into holes in the body. Stainless steel cap nuts shall be employed where bolt ends may damage equipment or cause injury. After the apparatus is painted and the overlays are reinstalled, they shall be additionally sealed at the edges with a caulking compound. The exterior top tread plate overlay shall be mounted flush with the outer edges of the apparatus body.

Any designated horizontal standing or walking surface higher than 48" from the ground and not guarded by a railing, or structure at least 12" high shall have a "safety yellow line" marking the outside perimeter of the designated standing or walking surface area. Yellow reflective SCENEdots shall be used to create the line along the outside edges of standing an walking surfaces. Steps and ladders shall not be required to have the yellow line.

STEPPING SURFACES

All steps shall have a surface area of at least 35 square inches and shall be able to withstand a load of at least 500 pounds. Steps shall be provided at any area that personnel may need to climb and shall be adequately lighted.

BODY RUB RAILS

Rub rails shall be installed beneath the compartment doors to protect them from damage should the body be brushed or rubbed against another object. The rub rails shall be 3/16” aluminum channel, 2-1/2” x 1”. The rub rails shall be highly polished and then bright dip anodized.

The rub rails shall be installed on the body utilizing non-corrosive nylon spacers and secured with stainless steel bolts. The outside edge of the rub rails shall be even with the fenderettes and bolt-on steps to prevent snagging.

TWO REAR TOW EYES

There shall be two (2) chrome plated tow eyes installed at the rear of the apparatus, above the rear step area. The tow eyes shall be bolted to a heavy-duty assembly that is welded to the torque box. The tow eyes shall have a 2-1/2" ID hole.

REAR WHEEL WELLS

The fenders shall be integral with the body sides and compartments with a seamless appearance. The fenders shall be fitted with bolt-in removable full circular inner liners in the wheel well area for ease of cleaning and maintenance. There shall be sufficient clearance provided in the wheel well to allow the use of tire chains when the apparatus is fully loaded.

STAINLESS STEEL REAR FENDERETTES

Four (4) stainless steel fenderettes shall be installed at the outboard edge of the rear wheel well area, two (2) on each side. The fenderettes shall be bolted to the apparatus body using nylon washers to space them slightly away from the body to reduce build-up of road grime. The fenderettes shall be constructed of stainless steel that has been polished to a high quality finish.

EXHAUST HEAT DEFLECTOR SHIELD

There shall be a 5" heat deflector shield installed over the exhaust to aid in dissipating the heat to prevent exhaust heat from adversely affecting anything stored in the body.

FUEL TANK GAUGE ACCESS PANEL

There shall be access provided in the torque box for service of the fuel tank gauge without need for removing the fuel tank.

LICENSE PLATE BRACKET

There shall be a license plate bracket mounted on the rear of the apparatus. A clear LED light shall be incorporated into the bracket.

TRIMRITE® STAINLESS STEEL FASTENERS

TrimRite® stainless steel fasteners shall be provided for all exposed and unpainted fasteners throughout the body in locations such as overlays, pump panels, and other numerous hardware mounting locations. TrimRite® stainless is a hardenable martensitic stainless steel that provides a high level of corrosion resistance, hardness up to Rockwell C 51, good cold formability and ease of heat treatment, all of which combine to provide an alloy which has been used for many applications such as fasteners, especially self-drilling types. TrimRite® stainless are tested to salt spray standard ASTM B117, which is a 200-hour salt spray test. The OEM shall use TrimRite® stainless with an added blue patch which provides improved vibration resistance for the fastener.

TURNTABLE ACCESS STEPS - DRIVER'S SIDE

For access to the turntable, a set of steps shall be installed on the driver's side of the apparatus. The step design shall utilize two (2) air cylinders to aid in the deployment of the steps into the climbing position and a positively locking mechanism to lock the step assembly into the travel position. The main structural members of the assembly shall be

fabricated from 12 gauge 304 stainless steel with aluminum tread plate overlays on the step area. The degree of slip resistance shall be in compliance with the intent of NFPA 1901.

The steps shall be designed as a two (2) part assembly. The lower step assembly shall swing out and down and the upper assembly will angle when the lower assembly is in down position to an approximate slope of 81 degrees to provide ease of access from ground to first step and allow for the maximum angle of departure of the apparatus. When the access ladder is in the down position, the maximum height from the ground to the first step shall not exceed 24". All remaining steps shall have a maximum stepping height that shall not exceed 18".

The access ladder shall be connected to the door open warning circuit to warn the driver it is not in the stored position. Steps shall be illuminated for night time operation with On-Scene Night Axe 9" LED lighting. The lighting shall be enclosed within a tough waterproof Lexan tube enclosure and covered with an aluminum bezel for protection from impact and environmental elements; and shall be activated by the parking brake. To aid in ascending and descending the access steps, knurled aluminum handrails shall be provided on each side of the steps.

Knurled Aluminum Handrail shall be mounted on the body (Rear) Top-Left Side, Rearward of the Turntable Access Ladder Horizontally.

FRONT VERTICAL AREA TREAD PLATE OVERLAYS

There shall be a tread plate overlay on the vertical areas of each side of the apparatus body. The overlay will be located in front of the body compartments.

FRONT BODY STEPS AND LIGHTING

There shall be four (4) Cast Products folding steps located on the front of the officer's side body compartments. The folding steps shall have two large open slots to prevent the buildup of ice or mud and to provide a handhold when necessary. The steps shall have a surface area of at least 35 square inches and shall be able to withstand a load of 500 pounds.

The steps shall be adequately lit with LED lighting. There shall be one (1) light located above the steps.

HANDRAILS

All handrails, unless otherwise stated, shall be constructed of knurled aluminum of not less than 1-1/4" in diameter. All railing shields and brackets shall be chrome plated, and shall be bolted to the body with stainless steel bolts. The lower bracket on all vertical handrails shall have a drain hole drilled in it at the lowest point.

The following handrails shall be provided on the apparatus:

There shall be a handrail installed on the top officer's side front of the body.

There shall be a horizontal handrail installed above the officer's side pump panel.

Shop Note: Shall be mounted above the right side pump module access door.

GROUND LADDER STORAGE

The ground ladders shall be stored within the two enclosed compartments, located between the torque box and the inside wall of the side compartments. The ladders shall be removable from the rear of the apparatus. The ladders shall be enclosed so road dirt and debris cannot foul or damage the ladders. The ladders shall rest in full-length slides and be arranged so they can be removed individually. The slides shall be lined with Nylon to aid in moving ladders.

The following ground ladders shall be supplied with the apparatus:

One (1) Duo Safety, model 585-A, 10' folding ladder shall be provided. The ladder shall have a 300 pound duty rating and Duo Safety ladder shoes for slip resistance.

One (1) Duo Safety model 701, 14' "FRESNO" attic extension ladder shall be provided. The ladder shall have a 750 pound duty rating and a narrow thirteen inch rail width.

One (1) Duo Safety, model 875-A, 16' aluminum roof ladder shall be provided. The ladder shall have a 750 pound duty rating and aluminum roof hooks that fold for storage.

One (1) Duo Safety, model 900-A, 24' two section aluminum extension ladder shall be provided. The ladder shall be constructed with 6061-T6 aluminum alloy and shall have a 750 pound duty rating. The ladder shall have a closed length of 14' 2.75".

One (1) Duo Safety, model 1225-A, 35' three section aluminum extension ladder shall be provided. The ladder shall be constructed with 6061-T6 aluminum alloy and shall have a 750 pound duty rating. The ladder shall have a closed length of 15' 3".

PIKE POLE STORAGE

There shall be six (6) aluminum tubes for the storage of pike poles installed inside the upper portion of the torque box.

The following pike poles shall be supplied with this location on the apparatus:

Two (2) Duo Safety, model FP6, 6' fiberglass pike poles shall be provided. Each pike pole shall have an extruded aluminum head with a permanent molded-in yellow color.

Two (2) Duo Safety, model FP8, 8' fiberglass pike poles shall be provided. Each pike pole shall have an extruded aluminum head with a permanent molded-in yellow color.

Two (2) Duo Safety, model FP12, 12' fiberglass pike poles shall be provided. Each pike pole shall have an extruded aluminum head with a permanent molded-in yellow color.

PIKE POLE STORAGE

There shall be two (2) aluminum trays for the storage of pike poles installed inside the upper portion of the torque box.

The following pike poles shall be supplied with this location on the apparatus:

Two (2) Duo Safety, model FP4D 4' fiberglass pike poles shall be provided. Each pike pole shall have an extruded aluminum head with a permanent molded-in yellow color and an all welded aluminum "D" handle.

The wheel chocks shall be stored in locations that are easily accessible under the front of the body on the driver's side of the apparatus.

WHEEL CHOCKS

There shall be one (1) pair of Cast Products model TMC1008-4 wheel chocks provided with the apparatus. The wheel chocks shall be mounted in Cast Products model TMC 1010 mounting brackets.

The wheel chocks shall be stored in locations that are easily accessible under the front of the body on the officer's side of the apparatus.

WHEEL CHOCKS

There shall be one (1) pair of Cast Products model TMC1008-4 wheel chocks provided with the apparatus. The wheel chocks shall be mounted in Cast Products model TMC 1010 mounting brackets.

INDEPENDENT ALUMINUM PUMP MODULE

The pump module shall be fabricated from 1/8" 5052-H32, smooth aluminum sheet. The module shall be fabricated as an individual unit, independent from the body. The module shall be fabricated utilizing the break and bend technique in order to form a strong, yet flexible, structure. The pump module shall be fabricated using precision holding fixtures to ensure proper dimensions and all attachment points shall be heavily reinforced.

PUMP COMPARTMENT LIGHTS

The pump compartment shall be equipped with two (2), 9" On-Scene Night Axe LED compartment lights. The lights shall be rated at 100,000 hours of service. The light shall be waterproof and magnesium chloride resistant. The light shall be enclosed in tough 5/8" Lexan tube. Multi-clip attachments shall allow for easy installation.

DRIVER'S SIDE RUNNING BOARD

A modular bolt-on running board shall be installed on the driver's side of the pump module. The running board shall be constructed of anti-slip tread plate. The outside edge of the running board shall be flush with the rub rail that is installed on the body to maintain a uniform appearance. The running board shall be installed with sufficient support to form a sturdy, non-deflecting step area for personnel.

OFFICER'S SIDE RUNNING BOARD

A modular bolt-on running board shall be installed on the officer's side of the pump module. The running board shall be constructed of anti-slip tread plate. The outside edge of the running board shall be flush with the rub rail that is installed on the body to maintain a uniform appearance. The running board shall be installed with sufficient support to form a sturdy, non-deflecting step area for personnel.

PULL OUT PLATFORM

There shall be one (1) Innovative Industries pull out platform located on the driver's side of the pump module. The top surface of the platform shall be constructed of aluminum serrated bar grating for ease of maintenance and to provide a slip resistant surface for the operator. The platform shall lock in both the retracted and the extended position. The

pull out platform shall be capable of supporting a maximum of 500 pounds and shall be wired to the door-ajar circuit.

The pull out platform's roller assembly shall have a powder coat finish for added corrosion protection.

FRONT PUMP ACCESS PANEL

There shall be a tread plate access panel provided on the front of the pump compartment. The panel shall be of the single pan design and shall be positively latched in the closed position utilizing a push button latch. An aluminum sill protector shall be installed on the bottom of the door opening to protect the paint from chipping and scratching. This area shall be accessible when the cab is tilted.

OFFICER'S SIDE PUMP ACCESS PANEL

There shall be a tread plate door above the officer's side pump panel to allow access to the pump compartment. The vertically hinged panel shall be of the single pan design and shall be positively latched in the closed position utilizing a push button latch. A gas strut shall be provided on the door. An aluminum sill protector shall be installed on the bottom of the door opening to protect the paint from chipping and scratching. The door shall be wired into the door open warning light circuit.

CONTROL PANEL

The driver's side of the pump enclosure shall be divided into two sections. The lower section shall be where all valve controls, the primer control, the discharge relief valve controls (pilot valve), and other mechanical controls are located. This surface shall be referred to as the "control panel".

All valve controls shall be the self-locking type, activated by either direct control or with a direct linkage utilizing friction locking bell cranks and universal ball swivels. The primary valve handles shall have color coded tags installed in a recessed area to clearly denote the purpose of each control.

INSTRUMENT PANEL

The surface above the control panel shall contain all instruments, gauges, test fittings, and optional controls. This surface shall be referred to as the "instrument panel". The instrument panel shall be independent and hinged and latched so that it may be opened. All instruments, gauges, and other equipment shall be installed with sufficient slack in any cabling, tubing, or plumbing to allow the panel to swivel to the fully open position.

The instrument and gauge panel shall be vertically hinged "swing out" to provide access for service.

OFFICER'S SIDE PUMP PANEL

A single panel shall be installed on the officer's side of the pump enclosure. This shall be the area where any officer's side discharges, inlets, steamers, and other pump associated equipment are located. This panel shall be easily removable and held in place with quick release push latches. It shall be fully removable for pump and plumbing access without the need to use hand tools. Any electrical equipment that may be installed shall be equipped with connectors so they may be easily separated from the

opening created when the below described front access panel is removed.

PANEL SURFACES

The control panel, instrument panel, and officer's side pump panel shall be coated with black Line-X® for maximum resistance to abrasion and to minimize glare. The material shall be capable of withstanding the effects of extreme temperatures and weather.

GARNISH RING BEZEL ASSEMBLIES

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

VERBIAGE TAG BEZEL ASSEMBLIES

Innovative Controls verbiage tag bezels shall be installed. The bezel assemblies will be used to identify apparatus components. These tags shall be designed and manufactured to withstand the specified apparatus service environment and shall be backed by a warranty equal to that of the exterior paint and finish. The verbiage tag bezel assemblies shall include a chrome-plated panel-mount bezel with durable easy-to-read UV resistant polycarbonate inserts featuring the specified verbiage and color coding. These UV resistant polycarbonate verbiage and color inserts shall be sub-surface screen printed to eliminate the possibility of wear and protect the inks from fading. Both the insert labels and bezel shall be backed with 3M permanent adhesive (200MP), which meets UL969 and NFPA standards.

SAFETY MESSAGE BEZEL ASSEMBLIES

Innovative Controls safety message bezels shall be installed. The bezel assemblies will be used to identify, instruct, or warn the operators. These tags shall be designed and manufactured to withstand the specified apparatus service environment and shall be backed by a warranty equal to that of the exterior paint and finish. The safety message bezel assemblies shall include a chrome-plated panel-mount bezel with durable easy-to-read UV resistant polycarbonate inserts featuring ANSI safety standard graphics or custom graphics. These UV resistant polycarbonate graphic inserts shall be sub-surface screen printed to eliminate the possibility of wear and protect the inks from fading. Both the graphic insert labels and bezel shall be backed with 3M permanent adhesive (200MP), which meets UL969 and NFPA standards.

PUMP PANEL LIGHTING

The pump operator's control panel and the officer's side pump panel shall each be illuminated by On-Scene LED Night Axe lighting. The pump panel lights shall become energized upon setting the parking brake so the gauge information provided may be consulted at any time the apparatus is parked. A stainless steel shield shall be installed

over the pump panel lights to further protect them from the elements and to act as a reflector for additional illumination.

The pump panel lighting shall become energized automatically upon setting the park brake so the gauge information may be consulted at any time the apparatus is parked.

MIDSHIP MOUNT FIRE PUMP

The pump shall be a Waterous CSUC20 2000 U.S. GPM (8000 LPM) fire pump. The pump shall be a single stage centrifugal class "A" rated fire pump, designed specifically for the fire service.

The pump body shall be cast as two (2) horizontally split pieces. The body shall be made of high tensile, close-grained gray iron with a minimum tensile strength of 40,000 PSI.

FLAME PLATED IMPELLER HUBS

The pump impellers shall be bronze, specifically designed for the fire service and accurately balanced for vibration free running. The stripping edges shall be located on opposite sides of the impellers to reduce shaft deflection.

The impeller shaft shall be stainless steel, accurately ground to size and supported at each end by oil or grease lubricated anti-friction ball bearings for rigid, precise support. The bearings used on the impeller shaft shall be automotive type bearings, easily cross-referenced and readily available at normal parts or bearing stores.

The impeller hubs shall be flame plated with tungsten carbide to hardness approximately twice that of tool steel to assure maximum pump life and efficiency. During the flame plating process the base metal shall not be allowed to exceed a temperature of 300 degrees Fahrenheit to prevent altering the metallurgical properties of the impeller material.

IMPELLER WEAR RINGS

The pump shall be equipped with replaceable bronze wear rings for increased pump life and minimum maintenance cost. The wear rings shall be designed to fit into a groove in the face of the impeller hubs forming a labyrinth that, as the clearance increases with age, directs water from the discharge side in several directions eventually exiting outward, away from the eye of the impeller hub.

LUBRICATION SYSTEM

An internal lubrication system shall deliver lubricant directly to the drive chain. This unique design shall eliminate the need for an external lubrication pump and auxiliary cooling. Oil shall be supplied with the lubrication system.

PUMP TRANSMISSION

The pump shall have a Waterous model C20 series transmission. The housing of the transmission shall be constructed of high strength, three piece, horizontally split aluminum. The drive line shafts shall be made from alloy steel forgings, hardened and ground to a size 2.350 inch 46 tooth involute spline. The drive and driven sprockets shall be made of steel and shall be hardened and have ground bores. The drive chain shall be

a Morse HV™ high strength involute form chain. Bearings shall be deep groove, anti friction ball bearings and shall give support and proper alignment to the impeller shaft assembly. Bearings shall be oil splash lubricated, completely separated from the water being pumped, and protected by a V-ring and oil seal. An internal lubrication system shall deliver lubricant directly to the drive chain. This unique design eliminates the need for an external lubrication pump and auxiliary cooling. The pump and transmission shall be easily separable. A two-piece shaft shall be splined allowing for individual repair of either the pump or transmission, to keep down time to a minimum. All drive line components shall have a torque rating equal to or greater than the final net engine torque.

PUMP PACKINGS

The stuffing boxes shall be equipped with Waterous Grafoil® two-piece adjustable packing glands.

ZINC ANODES

There shall be four (4) Waterous zinc anodes provided with the fire pump. The anodes shall aid in preventing galvanic corrosion within the water pump and be easily replaceable. The anodes shall be installed as follows:

- Two (2) on the intake side of the pump
- Two (2) in the discharge manifold of the fire pump.

The pump shall be rated at 2000 gallons per minute.

FIRE PUMP MOUNTING

The fire pump shall be mounted within a separate body module that is not directly connected to the apparatus body.

The pump shall be frame mounted; therefore minimizing the likelihood of the pump casing cracking should the apparatus be involved in a collision.

The pump module shall be mounted to the frame in four (4) locations and shall be reinforced appropriately in order to carry the expected load for the life of the apparatus.

PUMP SHIFT

The pump shift shall be supplied and installed by the chassis manufacturer.

The pump system shift indicator lights in the chassis cab shall be supplied and installed by the chassis manufacturer.

There shall be one (1) green pump system shift indicator light located on the operator's panel. This light shall only become engaged when the chassis parking brake has been set and when the pump and the chassis transmissions have been completely shifted into the correct gears. The light shall be located adjacent to the throttle control and shall be labeled "Warning: Do Not Open Throttle Unless Light Is On".

PRESSURE GOVERNOR

There shall be a Fire Research Pump Boss 400 pressure governor and monitoring display kit installed. The kit shall include a control module, intake pressure sensor, discharge pressure sensor, and cables. The control module case shall be waterproof and

have dimensions not to exceed 6 3/4" high by 4 5/8" wide by 1 1/2" deep. The control knob shall be 2" in diameter with no mechanical stops, have a serrated grip, and a red idle push button in the center. It shall not extend more than 1 3/4" from the front of the control module. Inputs for monitored information shall be from a J1939 data bus or independent sensors. Outputs for engine control shall be on the J1939 data bus or engine specific wiring. Inputs to the control module from the pump discharge and intake pressure sensors shall be electrical.

The following continuous displays shall be provided:

- Engine RPM; shown with four daylight bright LED digits more than 1/2" high
- Check engine and stop engine warning LEDs
- Oil pressure; shown on a dual color (green/red) LED bar graph display
- Engine coolant temperature; shown on a dual color (green/red) LED bar graph display
- Transmission Temperature: shown on a dual color (green/red) LED bar graph display
- Battery voltage; shown on a dual color (green/red) LED bar graph display
- Pressure and RPM operating mode LEDs
- Pressure / RPM setting; shown on a dot matrix message display
- Throttle ready LED

The dot-matrix message display shall show diagnostic and warning messages as they occur. It shall show monitored apparatus information, stored data, and program options when selected by the operator. All LED intensity shall be automatically adjusted for day and night time operation.

The program shall store the accumulated operating hours for the pump and engine to be displayed with the push of a button. The kit shall monitor inputs and support audible and visual warning alarms for the following conditions:

- High Battery Voltage
- Low Battery Voltage (Engine Off)
- Low Battery Voltage (Engine Running)
- High Transmission Temperature
- Low Engine Oil Pressure
- High Engine Coolant Temperature
- Out of Water (visual alarm only)
- No Engine Response (visual alarm only)

The program features shall be accessed via push buttons located on the front of the control module. There shall be a USB port located at the rear of the control module to upload future firmware enhancements.

The governor shall operate in two control modes, pressure and RPM. No discharge pressure or engine RPM variation shall occur when switching between modes. A throttle ready LED shall light when the interlock signal is recognized. The governor shall start in pressure mode and set the engine RPM to idle. In pressure mode the governor shall automatically regulate the discharge pressure at the level set by the operator. In RPM mode the governor shall maintain the engine RPM at the level set by the operator except in the event of a discharge pressure increase. The governor shall limit a discharge pressure increase in RPM mode to a maximum of 30 psi. Other safety features shall include recognition of no water conditions with an automatic programmed response and a push button to return the engine to idle.

An interlock system shall be provided to prevent advancement of the engine speed at the pump operator’s panel unless the apparatus has “Throttle Ready” indication.

The pressure governor and monitoring pressure display shall be programmed to interface with a specific engine.

INTAKE RELIEF VALVE

There shall be an Elkhart Brass intake relief valve installed on the suction side of the pump. The valve shall be the preset type, adjustable from 75 to 250 PSI, and shall be designed to prevent vibration from altering the setting. The relief outlet shall be directed below the pump with the discharge terminating in a 2-1/2" male NST connection. The discharge shall be away from the pump operator and labeled "Do Not Cap".

TRIDENT PRIMING PUMP

The priming pump shall be a Trident Emergency Products, model 31.001.7 three barrel, compressed air powered, high efficiency, multi-stage, venturi based AirPrime™ System. All wetted metallic parts of the priming system are to be of brass and stainless steel construction. There shall be a pressure protection valve installed with the priming pump. A single panel mounted control shall activate the priming pump and open the priming valve to the pump.

MASTER DRAIN VALVE

A Trident manifold drain valve assembly shall be supplied. This drain shall provide the capability to drain the entire pump by turning a single control. The valve assembly shall consist of a stainless steel plate and shaft in a bronze body with multiple ports. The drain valve control shall be mounted on the driver's side pump panel and labeled "Master Drain".

PUMP PRIMED BLACK BY PUMP MANUFACTURER

The pump shall be primed black by the pump manufacturer.

The main intake(s) shall be unpainted and any auxiliary intake(s) shall be the same color as they arrived from the valve manufacturer.

PUMP AND ENGINE COOLING SYSTEM

There shall be a pump and engine cooling system provided on the apparatus. The cooling system shall keep the engine cool when running for long periods of time and the pump cool during long periods of pumping when water is not being discharged. The cooling system shall also be setup in a way that the cooling system lines can be easily drained through the master pump drain.

The cooling system lines shall consist of high-pressure, high-temperature 3/8" (inside diameter) abraded rubber hose. The engine cooling lines shall be installed with one (1) line going from the discharge side of the water pump through an Innovative Controls, model 3004204-2-2, 3/8" in-line quarter turn ball valve assembly and continuing on to the chassis heat exchanger. The return line from the heat exchanger shall then run into the suction side of the pump. The pump cooling lines shall be installed with one (1) line going from the discharge side of the water pump through an Innovative Controls, model 3004204-2-2, 3/8" in-line quarter-turn ball valve assembly up to the water tank. At the water tank, the pump cooling line shall be plumbed into a 3/8" check valve on the "Tank Fill" valve. The check valve shall prevent tank water from back flowing into the pump when the cooling system is not in use. A return line from the water tank shall be plumbed

into the water pump.

The engine cooling system valve shall be controlled on the operator's panel, and shall be clearly labeled, "Engine Cooler".

The pump cooling system valve shall be controlled on operators panel, and shall be clearly labeled, "Pump Cooler".

ENGINEERING FOR FUTURE FOAM SYSTEM

The stainless manifold on the pump shall be engineered for the future installation of a future Foam Pro 2001/2002 single foam system. In addition to the plumbing, the pump operators control panel shall have open space left for installation of future foam controls.

PLUMBING MANIFOLD

The plumbing manifold shall consist of the inlet side manifold and the discharge side manifold. Galvanized Victaulic couplings shall be used wherever possible for ease of maintenance and superior corrosion protection.

The inlet side of the plumbing manifold shall utilize schedule 10, 304 grade stainless steel tubing and preformed elbows for inlets that are larger than 3”. Side auxiliary inlets that are 3” or smaller shall utilize schedule 40, 304 grade stainless steel threaded tubing and preformed elbows. The inlet manifold shall thread into the pump auxiliary inlet ports and each inlet valve shall thread onto the inlet manifold.

The discharge side of the plumbing manifold shall utilize schedule 40, 304 grade stainless steel tubing and preformed elbows to ensure the quality of the manifold where welds are required. The discharge manifold shall connect to the pump discharge ports using ½” stainless steel flanges that shall be machined to seat an O-ring to ensure a leak proof seal. Each discharge shall derive from a port on the manifold assembly connected to a discharge valve with 1/2” 304 grade stainless steel flanges. Discharges that terminate in a location other than the pump module (i.e. rear discharges) that do not require welding shall utilize a combination of high pressure flex hose and schedule 10, 304 grade stainless steel tubing to allow flexibility between the body and the pump module.

There shall be a Trident Emergency Products 3/4" quarter turn drain valve included. There shall be a chrome plated rectangular handle provided on the drain valve to facilitate use with a gloved hand. The drain valve shall be located just above the running board and below the pump panel to reduce clutter in the pump panel area. The drain valve shall be connected to the valve with flexible hose that is routed in such a manner as to assure complete drainage to below the apparatus. A matching color coded bezel shall be included.

INNOVATIVE CONTROLS DISCHARGE GAUGES - 2-1/2" - 0-400PSI

The discharge gauges on the apparatus shall be 2 ½” (63mm) diameter Innovative Controls pressure gauges. The gauges shall have a one-piece die-cast brass case that integrates the valve stem connection, movement support, and bourdon tube support into a single unit that eliminates distortion and leakage. Clear scratch resistant molded lenses shall be used to ensure distortion-free viewing and they shall be sealed to the gauge by being trapped together with a profile gasket by a crimped stainless steel bezel. The gauges shall be filled with a synthetic mixture to dampen shock and vibration,

lubricate the internal mechanisms, prevent lens condensation and ensure proper operation from –40°F to +160°F.

The gauges shall exceed ASME B40.100 Grade B requirements with an accuracy of +/- 1.5% full scale and include a size appropriate phosphorous bronze bourdon tube with a reinforced lap joint and large tube base to increase the tube life and gauge accuracy.

Highly-polished stainless steel bezels shall be provided to prevent corrosion and protect lenses and gauge cases. The gauges shall be installed into decorative chrome-plated mounting bezels that incorporate valve identifying verbiage and/or color labels.

The gauges shall display a range from 0 to 400 psi and shall have an orange tip on the pointer.

MASTER PRESSURE CENTER ASSEMBLY

The master gauges shall be installed on the pump panel no more than 6 inches apart in an integrated master pressure assembly that includes the two (2) master gauges and the test port manifold.

The master intake and master discharge gauges shall be 4” (101mm) diameter Innovative Controls pressure gauges. Each gauge shall have a one-piece die-cast brass case that integrates the valve stem connection, movement support, and bourdon tube support into a single unit that eliminates distortion and leakage. A clear scratch resistant molded lens shall be used to ensure distortion-free viewing and it shall be sealed to the gauge by being trapped together with a profile gasket by a crimped stainless steel bezel. The gauge shall be filled with a synthetic mixture to dampen shock and vibration, lubricate the internal mechanisms, prevent lens condensation and ensure proper operation from –40°F to +160°F.

Each gauge shall exceed ASME B40.100 Grade B requirements with an accuracy of +/- 1% full scale and include a size appropriate phosphorous bronze bourdon tube with a reinforced lap joint and large tube base to increase the tube life and gauge accuracy. A highly-polished stainless steel bezel shall be provided to prevent corrosion and protect the lens and gauge case.

The two (2) master gauges shall be installed into a decorative chrome-plated zinc mounting bezel that also incorporates a test port manifold and a graphic overlay that identifies the master intake and discharge gauges, the vacuum test port, and the pressure test port. The test port manifold is solid cast brass with chrome-plated plugs.

The gauge on the left shall be the master pump intake gauge and display a range from -30 to 400 psi with black graphics on a white background. The gauge on the right shall be the master pump discharge gauge and display a range from 0 to 400 psi with burgundy graphics on a white background.

The non-Storz discharge and intake fittings provided on this apparatus shall be Trident Emergency Products, LLC Brand. The adapter/cap/plug fittings shall be manufactured from high-quality brass that shall be polished to remove manufacturing irregularities with a chrome finish applied to the polished surface.

The Storz discharge and intake fittings provided on this apparatus shall be Task Force Tips Brand. For corrosion resistance, the adapter shall be constructed of hard coat

anodized aluminum alloy and include a polymer bearing ring for prevention of galvanic corrosion.

The auxiliary intake(s) shall terminate with NST swivels, and the discharges shall terminate with NST male threads.

DISCHARGE, PRE-CONNECT, AND INTAKE DRAINS

There shall be an Innovative Controls 3/4" quarter turn drain valve included on each discharge, gated intake, and steamer valve (if applicable). There shall be a side stem, long stroke chrome plated lift handle provided on the drain valve to facilitate use with a gloved hand. The drain valve shall have a verbiage tag that angles upward so that it can easily be seen and read by the operator before opening. The drain valve shall be located just above the running board and below the pump panel to reduce clutter in the pump panel area. The drain valve shall be connected to the valve with a flexible hose that is routed in such a manner as to assure complete drainage to below the apparatus. A matching color coded bezel shall be included.

2" TANK FILL

There shall be a 2" tank fill plumbed from the pump to the tank. Installation shall be completed with 2" Class 1 rubber hose and stainless steel hose couplings.

An Akron Brass, model 8820, 2" Swing-Out™ valve shall be provided. The valve shall have an all brass body with flow optimizing stainless steel ball and dual polymer seats. The valve shall be capable of dual directional flow while incorporating a self-locking ball feature using an automatic friction lock design and specially designed flow optimizing stainless steel ball. The valve shall not require lubrication of seats or any other internal waterway parts, and must be capable of swinging out of the waterway for maintenance by the removal of six bolts. The valve shall carry a ten (10) year warranty by the valve manufacturer.

The valve shall be actuated by an Akron Brass, model R1 manual actuator installed on the valve. The manual actuator shall be controlled by an Innovative Controls push/pull T-handle.

3" TANK-TO-PUMP

There shall be a 3" tank-to-pump plumbed with a Class 1 flexible hose from the tank to the suction side of the pump. There shall be an Akron Brass, model 8830, 3" Swing-Out™ valve shall be provided. The valve shall have an all brass body with flow optimizing stainless steel ball and dual polymer seats. The valve shall be capable of dual directional flow while incorporating a self-locking ball feature using an automatic friction lock design and specially designed flow optimizing stainless steel ball. The valve shall not require lubrication of seats or any other internal waterway parts, and must be capable of swinging out of the waterway for maintenance by the removal of six bolts. The valve shall also include a necessary B3-SH pump flange adapter, which shall be specifically used for the tank-to-pump line to properly adjust the plumbing based on the pitch of the pump. The valve shall carry a ten (10) year warranty by the valve manufacturer.

There shall be a check valve between the pump suction and the booster tank valve. The check valve shall eliminate back flow into the water tank when the pump is connected to a pressurized source.

The valve shall be actuated by an Akron Brass, model R1 manual actuator. The manual actuator shall be controlled by an Innovative Controls push/pull T-handle.

6" DRIVER SIDE MAIN INTAKE

There shall be a 6" main intake located on the driver's side of the pump module. The suction fittings shall include a removable die-cast screen to provide cathodic protection for the pump thus reducing corrosion. A short steamer barrel shall be installed to accommodate an intake valve without exceeding the legal overall body width. The intake shall terminate MNST thread.

There shall be one (1) Trident model 01.003.9, 6" NST vented long handle steamer cap provided. The cap shall have a chrome finish.

2-1/2" DRIVER'S SIDE AUXILIARY INTAKE

There shall be a 2-1/2" gated auxiliary intake, with 2-1/2" plumbing, provided on the driver's side of the pump module. The auxiliary intake shall be fully recessed behind the panel in order to keep the valve protected from the elements.

An Akron Brass, model 8825, 2-1/2" Swing-Out™ valve shall be provided. The valve shall have an all brass body with flow optimizing stainless steel ball and dual polymer seats. The valve shall be capable of dual directional flow while incorporating a specially designed flow optimizing stainless steel ball. The valve shall not require lubrication of seats or any other internal waterway parts, and must be capable of swinging out of the waterway for maintenance by the removal of six bolts. The valve shall be manufactured and assembled in the United States. The valve shall carry a ten (10) year warranty by the valve manufacturer.

The valve shall be actuated by an Akron Brass, model TSC manual actuator installed directly on the valve. The handle shall allow the valve to be controlled directly at the valve.

There shall be one (1) Trident, model 01.007.0, 2 1/2" NST plug with chain provided. The plug shall have a chrome finish.

6" OFFICER SIDE MAIN INTAKE

There shall be a 6" main intake located on the officer's side of the pump module. The suction fittings shall include a removable die-cast screen to provide cathodic protection for the pump thus reducing corrosion. A short steamer barrel shall be installed to accommodate an intake valve without exceeding the legal overall body width. The intake shall terminate MNST thread.

There shall be a Waterous model 82743 6" Monarch™ butterfly valve provided. The valve shall be a 6" full flow valve with a 6" NST nipple. Each valve shall be electrically operated from a solid state controller located on the pump panel. A seven light LED indicator shall show the position of the valve from fully closed to fully open. The valve shall meet current NFPA 1901 standards for opening and closing speed.

There shall be an access hole located on the pump panel to allow for overriding the electric valve. A specially designed tool shall be provided also.

There shall be an Innovative Controls, model 3004204-2-2, 3/8" in-line bleeder valve provided on the steamer inlet. The valve shall be used to bleed off air or water as per NFPA requirements.

There shall be an Elkhart Brass intake relief valve installed on the steamer valve. The valve shall be the preset type, adjustable from 75 to 250 PSI, and shall be designed to prevent vibration from altering the setting. The relief outlet shall be directed below the pump with the discharge terminating in a 2-1/2" male NST connection. The discharge shall be away from the pump operator and labeled "Do Not Cap".

There shall be one (1) Task Force Tips model #AH3HST-NX 6" female NST x 5" Storz 30 degree elbow provided. The elbow shall be configured with a 5" swivel Storz coupling and a 6" female NH swivel long handle coupling.

There shall also be one (1) Task Force Tips model A01ST 5" Storz blind cap with lanyard provided.

All intakes shall have the OEM Standard label package unless stated otherwise. All intake labels shall be burgundy in color. Specific verbiage on each intake label tag shall be determined at the pre-construction meeting.

2-1/2" DRIVER'S SIDE DISCHARGE

There shall be a 2-1/2" discharge, with 2-1/2" plumbing, located on the driver's side of the pump compartment. The discharge shall terminate MNST.

An Akron Brass model 8625 2-1/2" Swing-Out™ valve shall be provided. The valve shall have an all brass body with flow optimizing stainless steel ball and dual polymer seats. The valve shall be capable of dual directional flow while incorporating a specially designed flow optimizing stainless steel ball. The valve shall not require lubrication of seats or any other internal waterway parts, and must be capable of swinging out of the waterway for maintenance by the removal of six bolts. The valve shall be manufactured and assembled in the United States. The valve shall carry a ten (10) year warranty by the valve manufacturer.

The valve shall be actuated by an Akron Brass rack and sector actuator installed on the valve. The manual actuator shall be controlled by an Innovative Controls push/pull T-handle.

The discharge shall have a 2-1/2" brass case gauge with bezel and a display range from 0 to 400 psi. The gauge shall have a black dial graphic and an orange tip on the pointer.

There shall be one (1) Trident, model 01.010.0, 2-1/2" Female NST swivel rocker lug x 2-1/2" Male NST 30º elbow adapter provided.

There shall also be one (1) Trident, model 01.006.0, 2-1/2" NH vented rocker lug cap with chain provided.

2-1/2" DRIVER'S SIDE DISCHARGE

There shall be a 2-1/2" discharge, with 2-1/2" plumbing, located on the driver's side of the pump compartment. The discharge shall terminate MNST.

An Akron Brass model 8625 2-1/2" Swing-Out™ valve shall be provided. The valve shall have an all brass body with flow optimizing stainless steel ball and dual polymer seats.

The valve shall be capable of dual directional flow while incorporating a specially designed flow optimizing stainless steel ball. The valve shall not require lubrication of seats or any other internal waterway parts, and must be capable of swinging out of the waterway for maintenance by the removal of six bolts. The valve shall be manufactured and assembled in the United States. The valve shall carry a ten (10) year warranty by the valve manufacturer.

The valve shall be actuated by an Akron Brass rack and sector actuator installed on the valve. The manual actuator shall be controlled by an Innovative Controls push/pull T-handle.

The discharge shall have a 2-1/2" brass case gauge with bezel and a display range from 0 to 400 psi. The gauge shall have a black dial graphic and an orange tip on the pointer.

There shall be one (1) Trident, model 01.010.0, 2-1/2" Female NST swivel rocker lug x 2-1/2" Male NST 30º elbow adapter provided.

There shall also be one (1) Trident, model 01.006.0, 2-1/2" NH vented rocker lug cap with chain provided.

2-1/2" OFFICER'S SIDE DISCHARGE

There shall be a 2-1/2" discharge, with 2-1/2" plumbing, located on the officer's side of the pump compartment. The discharge shall terminate MNST.

An Akron Brass, model 8825, 2-1/2" Swing-Out™ valve shall be provided. The valve shall have an all brass body with flow optimizing stainless steel ball and dual polymer seats. The valve shall be capable of dual directional flow while incorporating a specially designed flow optimizing stainless steel ball. The valve shall not require lubrication of seats or any other internal waterway parts, and must be capable of swinging out of the waterway for maintenance by the removal of six bolts. The valve shall be manufactured and assembled in the United States. The valve shall carry a ten (10) year warranty by the valve manufacturer.

The valve shall be actuated by an Akron Brass, model R1, manual actuator installed on the valve. The manual actuator shall be controlled by an Innovative Controls push/pull T-handle.

The discharge shall have a 2-1/2" brass case gauge with bezel and a display range from 0 to 400 psi. The gauge shall have a black dial graphic and an orange tip on the pointer.

There shall be one (1) Trident, model 01.010.0, 2-1/2" Female NST swivel rocker lug x 2-1/2" Male NST 30º elbow adapter provided.

There shall also be one (1) Trident, model 01.006.0, 2-1/2" NH vented rocker lug cap with chain provided.

4" OFFICER'S SIDE DISCHARGE

There shall be a 4" large diameter discharge, with 4" plumbing, located on the officer's side of the pump compartment. The discharge shall terminate MNST.

An Akron Brass, model 8630, 3" Swing-Out™ valve shall be provided. The valve shall have an all brass body with flow optimizing stainless steel ball and dual polymer seats. The valve shall be capable of dual directional flow while incorporating a specially

designed flow optimizing stainless steel ball. The valve shall not require lubrication of seats or any other internal waterway parts, and must be capable of swinging out of the waterway for maintenance by the removal of six bolts. The valve shall be manufactured and assembled in the United States. The valve shall carry a ten (10) year warranty by the valve manufacturer.

The valve shall be actuated by an Akron Brass manual gear actuator installed on the valve. The gear actuator shall operate at a 50:1 gear ratio, which operates from fully open to fully closed in twelve (12) rotations.

The gear actuator shall be controlled by an Akron Brass 4" handwheel valve controller. The handwheel worm gear shall be connected to the remote mounted valve via a rod assembly. The handwheel shall turn a gear sector mounted on the valve for smoother and easier operations under pressure. A position indicator shall show the position of the ball valve as per NFPA 1901. Opening and closing speed shall comply with the current NFPA standard to minimize effects of water hammer.

The discharge shall have a 2-1/2" brass case gauge with bezel and a display range from 0 to 400 psi. The gauge shall have a black dial graphic and an orange tip on the pointer.

There shall be one (1) Task Force Tips, model #AH3ST-NP 30 degree elbow provided. The elbow shall be configured with a 5" swivel Storz coupling and a 4" female NH swivel rocker lug coupling.

There shall also be one (1) Task Force Tips, model A01ST 5" Storz blind cap with lanyard provided.

1-1/2" FRONT BUMPER DISCHARGE

There shall be a 1-1/2" discharge located above the gravel shield on the officer's side of the front bumper. The discharge shall be plumbed with 2" plumbing and high pressure flex hose with stainless steel couplings. The discharge shall terminate MNST.

The discharge shall have Class1 model 34AD automatic drains installed in the low routed areas below the manual drain. The automatic drains shall open whenever pressure in the line drops below 6 psi.

The discharge shall be foam capable.

An Akron Brass, model 8820, 2" Swing-Out™ valve shall be provided. The valve shall have an all brass body with flow optimizing stainless steel ball and dual polymer seats. The valve shall be capable of dual directional flow while incorporating a specially designed flow optimizing stainless steel ball. The valve shall not require lubrication of seats or any other internal waterway parts, and must be capable of swinging out of the waterway for maintenance by the removal of six bolts. The valve shall be manufactured and assembled in the United States. The valve shall carry a ten (10) year warranty by the valve manufacturer.

The valve shall be actuated by an Akron Brass, model R1, manual actuator installed on the valve. The manual actuator shall be controlled by an Innovative Controls push/pull T-handle.

The discharge shall have a 2-1/2" brass case gauge with bezel and a display range from 0 to 400 psi. The gauge shall have a black dial graphic and an orange tip on the pointer.

The discharge shall be designated as a pre-connect and no cap and chain shall be supplied.

CROSSLAY CONFIGURATION

There shall be two (2) 1-1/2" and one (1) 2-1/2" crosslay pre-connects located above the front stabilizers. Class1 high-pressure flex hose with stainless steel couplings shall be used in the plumbing.

A Trident 90º swivel elbow shall be utilized to keep the hose from kinking when pulled from either side of the apparatus. The swivel for each crosslay shall be located outboard for ease of making connections while changing hose.

The pre-connect hose beds shall be sized to accommodate the following hose load:

The interior of the pre-connect hose bed shall have a maintenance free abraded finish.

The floor of the preconnect area shall be covered with Dura-Dek fiber reinforced material. The Dura-Dek shall have "T" beams in parallel connected with cross slats that are first mechanically bonded and then epoxied. The "T" sections shall be spaced 3/4" apart to allow for drainage and ventilation.

Stainless steel rollers shall be provided at each end of the crosslay hose bed to facilitate deployment of hose. Vertical rollers shall be installed on each side of the hose bed opening, and a horizontal roller shall be installed under the opening.

There shall be two (2) dividers in the crosslay area. Each divider shall be fabricated of 3/16" aluminum and be mounted in a channel on each end for adjustability. The dividers shall have a maintenance free abraded finish.

There shall be a heavy duty 22 oz. hypalon vinyl coated nylon cover located over the top and on each end of the pre-connected crosslays. The top of the cover shall be connected to the top-forward portion of the crosslays through a C-Rail channel and shall attach on the top-rear portion using Velcro. The bottom of the end covers shall be attached to the pump module utilizing hooks and bungee cord. The cover color shall be red.

The end covers of the crosslays shall be incorporated with the top cover.

1-1/2" PRECONNECT

There shall be a 1-1/2" preconnect with 2" plumbing. The preconnect shall terminate out a swivel MNST.

The 1-1/2" crosslay pre-connect shall have a capacity of 200' of 1-3/4" double jacket fire hose stored in a single stack.

The discharge shall be foam capable.

An Akron Brass, model 8820, 2" Swing-Out™ valve shall be provided. The valve shall have an all brass body with flow optimizing stainless steel ball and dual polymer seats. The valve shall be capable of dual directional flow while incorporating a specially designed flow optimizing stainless steel ball. The valve shall not require lubrication of seats or any other internal waterway parts, and must be capable of swinging out of the waterway for maintenance by the removal of six bolts. The valve shall be manufactured and assembled in the United States. The valve shall carry a ten (10) year warranty by

the valve manufacturer.

The valve shall be actuated by an Akron Brass, model R1, manual actuator installed on the valve. The manual actuator shall be controlled by an Innovative Controls push/pull T-handle.

The discharge shall have a 2-1/2" brass case gauge with bezel and a display range from 0 to 400 psi. The gauge shall have a black dial graphic and an orange tip on the pointer.

The discharge shall be designated as a pre-connect and no cap and chain shall be supplied.

1-1/2" PRECONNECT

There shall be a 1-1/2" preconnect with 2" plumbing. The preconnect shall terminate out a swivel MNST.

The 1-1/2" crosslay pre-connect shall have a capacity of 200' of 1-3/4" double jacket fire hose stored in a single stack.

The discharge shall be foam capable.

An Akron Brass, model 8820, 2" Swing-Out™ valve shall be provided. The valve shall have an all brass body with flow optimizing stainless steel ball and dual polymer seats. The valve shall be capable of dual directional flow while incorporating a specially designed flow optimizing stainless steel ball. The valve shall not require lubrication of seats or any other internal waterway parts, and must be capable of swinging out of the waterway for maintenance by the removal of six bolts. The valve shall be manufactured and assembled in the United States. The valve shall carry a ten (10) year warranty by the valve manufacturer.

The valve shall be actuated by an Akron Brass, model R1, manual actuator installed on the valve. The manual actuator shall be controlled by an Innovative Controls push/pull T-handle.

The discharge shall have a 2-1/2" brass case gauge with bezel and a display range from 0 to 400 psi. The gauge shall have a black dial graphic and an orange tip on the pointer.

The discharge shall be designated as a pre-connect and no cap and chain shall be supplied.

2-1/2" PRECONNECT

There shall be a 2-1/2" preconnect with 2-1/2" plumbing. The preconnect shall terminate out a swivel MNST.

The 2-1/2" crosslay pre-connect shall have a capacity of 150' of 2-1/2" double jacket fire hose stored in a single stack.

The discharge shall be foam capable.

An Akron Brass, model 8825, 2-1/2" Swing-Out™ valve shall be provided. The valve shall have an all brass body with flow optimizing stainless steel ball and dual polymer seats. The valve shall be capable of dual directional flow while incorporating a specially designed flow optimizing stainless steel ball. The valve shall not require lubrication of seats or any other internal waterway parts, and must be capable of swinging out of the

waterway for maintenance by the removal of six bolts. The valve shall be manufactured and assembled in the United States. The valve shall carry a ten (10) year warranty by the valve manufacturer.

The valve shall be actuated by an Akron Brass, model R1, manual actuator installed on the valve. The manual actuator shall be controlled by an Innovative Controls push/pull T-handle.

The discharge shall have a 2-1/2" brass case gauge with bezel and a display range from 0 to 400 psi. The gauge shall have a black dial graphic and an orange tip on the pointer.

The discharge shall be designated as a pre-connect and no cap and chain shall be supplied.

AERIAL WATERWAY DISCHARGE

There shall be a discharge plumbed to the aerial waterway with 4" plumbing. The plumbing shall be constructed from schedule 10 stainless steel components.

An Akron Brass, model 8940, 4" Swing-Out™ valve shall be provided. The valve shall have an all brass body with flow optimizing Fusion CF™ composite ball with Hydromax™ technology. The valve shall not require lubrication of seats or any other internal waterway parts, and must be capable of swinging out of the waterway for maintenance by the removal of four bolts. The valve shall carry a ten (10) year warranty by the valve manufacturer.

The valve shall be actuated by an Akron Brass electric actuator installed on the valve. The electric actuator shall have a 25:1 gear ratio, which actuates from fully open to fully close in eight (8) seconds, a clutchless motor, and utilize an electric controller with current limiting design.

The electric actuator shall be controlled by an Akron Brass, model 9325, Navigator™ Pro valve controller. The electric controls shall be of true position feedback design, requiring no clutches in the motor or current limiting. The unit shall be completely sealed with momentary open, close as well as an optional one (1) touch full open feature to operate the actuator. Three (3) additional buttons shall be available to be used for preset selection, preset activation, CAFS activation and menu navigation. The unit shall be capable of being connected to a Pressure Sensor and provide an LCD display showing pressure as well as valve position indication. Valve position indication shall be determined from true position feedback and indicate the exact position of the valve. The unit shall be capable of being used in conjunction with at least two (2) additional displays to control one (1) valve. The unit shall be able to be programmed to Bar, PSI or kPa for pressure. The unit shall have programmed pipe sizes and be capable of custom calibration to high and low flow ranges. The unit shall also be capable of turning on and off a solenoid used in a CAFS system. The only calibration required is to set the unit to the valve during initial set up. No other calibration shall be required. The display shall be a full color LCD display with a backlight. It shall have manual adjustment of the brightness as well as an auto-dimming option. Unit shall carry a five (5) year warranty.

ELECTRICAL SYSTEM

Wiring harnesses shall be the automotive type, engineered specifically for the builder's apparatus, and shall meet the following criteria. Under no circumstances shall diodes, resistors, or fusible links be located within the wiring harness. All such components shall

be located in an easy to access wiring junction box or the main circuit breaker area. All wire shall meet white book, baseline advanced design transit coach specification and Society of Automotive Engineers recommended practices. It shall be stranded copper wire core with cross-linked polyethylene insulation complying with SAE specification J1128. Each wire shall be hot stamp function coded every three inches starting one inch from the end and continuing throughout the entire harness. In addition to function coding, each wire shall be numbered, colored, and gauge coded.

Wire harnesses shall be wrapped with a high abrasion and chemical resistant thermoplastic polyester elastomer coated polyester yarn for braiding constructions of electrical wiring systems. The braid yarn shall have a minimum tensile strength of 15 lbs. before breaking and have a maximum of 20% elongation before breaking. Temperature properties for the yarn shall range from a minimum 280°F (138°C) service temperature to a maximum -112°F (-80°C) brittleness temperature with a cold flex tolerance of at least -49°F (-45°C).

Harnesses shall be modular in design; main harness system subdivided into several smaller sub-harnesses. The harness subsections shall be connected using Deutsch branded, heavy duty, environmentally sealed, connectors with silicone seals and a rear insertion/removal contact system. For isolation of electrical "zones" the harness subsections shall consist of a main harness, a pump harness with a separate pump gauge panel harness, a left body harness with a separate left compartment harness, a right body harness with a separate right compartment harness, and a rear body harness with two separate rear compartment harnesses.

The main harness and three body harnesses shall interconnect at a central, easy to reach location and their connectors shall not be obstructed by other harnesses or fuel/air lines. In addition, the main and body harness connectors shall be color-coded for ease of identification with their respective colors noted on the accompanying electrical diagrams.

Where connectors are not provided by the electrical component manufacturer, all 12-volt lights and other electrical components (excluding rocker and toggle switches) shall connect to the harnesses using Deutsch brand connectors; butt connectors are considered unacceptable.

All Deutsch connectors shall meet the following criteria:

- All connectors shall have a minimum IP67 rating.
- Temperature range from -67°F (-55°C) to 257°F (125°C) continuous at rated current.
- Only solid contacts will be used. Stamped and formed contacts are unacceptable.
- All contacts shall be soldered unless a crimping tool or machine is used that gives an even and precise pressure for the terminal being used.
- All contacts shall be pull-tested to ensure their integrity.

WEATHERPROOF DOOR SWITCHES

Due the harsh environment and susceptibility to moisture on the fire ground, the fire apparatus compartment doors shall utilize weatherproof switches. Two different types of switches shall be used. Weatherproof proximity switches shall be utilized.No Exceptions.

The switches shall be used for activation of the compartment lights and to provide a signal to the door open circuit in the cab.

V-MUX ELECTRICAL MANAGEMENT SYSTEM

The apparatus shall be equipped with a V-MUX Multiplex System. There are several key benefits to multiplexing, one is to reduce the number of connections in a vehicle's electrical system, because of this it is important to limit the amount of modules that control certain functions of the vehicle.

Outputs:

The outputs shall perform all the following items without added modules to perform any of the tasks:

- Load Shedding: The System shall have the capability to Load Shed with 8 levels any output. This means you can specify which outputs (barring NFPA restrictions) you would like Load Shed. Level 1 12.9v, Level 2 12.5V, Level 3 - 12.1V, Level 4 - 11.7V, Level 5 11.3V, Level 6 10.9V, Level 7 10.5, Level 8 10.1. Unlike conventional load shedding devices you can assign a level to any or all outputs. No add-on modules shall be acceptable; the module with the outputs must perform this function.
- Load Sequencing: The System shall be able to sequence from 0 8 levels any output. With 0 being no delay and 1 being a 1-second delay, 2 being a 2-second delay and so on. Sequencing reduces the amount of voltage spikes and drops on your vehicle, and can help limit damage to your charging system. No add-on modules shall be acceptable; the module with the outputs must perform this function.
- Output Device: The System shall have solid-state output devices. Each solid-state output shall be a MOS-FET (Metal Oxide Semiconductor - Field Effect Transistors); MOS-FETs are solid-state devices with no moving parts to wear out. A typical relay, when loaded to spec, has a life of 100,000 cycles. The life of a FET is more than 100 times that of a relay. No add-on modules shall be acceptable; the module with the outputs must perform this function.
- Flashing Outputs: The System shall be able to flash any output in either A or B phase, and logic is used to shut down needed outputs in park, or any one of several combined interlocks. The flash rate can be selected at either 80, or 160 FPM. This means any light can be specified with a multiplex truck with no need to add flashers. Flashing outputs can also be used to warn of problems. No add-on modules shall be acceptable; the module with the outputs must perform this function.
- PWM: The modules shall have the ability to PWM at some outputs so that a Headlight PWM module is not needed. No add-on modules shall be acceptable; the module with the outputs must perform this function.
- Diagnostics: An output shall be able to detect either a short or open circuit.

Inputs:

The inputs shall have the ability to be switched by a ground or battery signal.
The inputs shall be filtered for noise suppression via hardware and software so that RF or dirty power will not trick an input into changing its status.

System Network:

The Multiplex system shall contain a Peer-to-Peer network. A Master-Slave Type network is not suitable for the Fire/Rescue industry. A Peer-to-Peer network means that all the modules are equal on the network; a Master is not needed to tell other nodes when to talk.

System Reliability:

The Multiplex system shall be able to perform in extreme temperature conditions, from -40° to +85° C (-40° to +185° F.) The system shall be sealed against the environment, moisture, humidity, salt or fluids such as diesel fuel, motor oil or brake fluid. The enclosures shall be rugged to withstand being mounted in various locations or compartments around the vehicle. The modules shall be protected from over voltage and reverse polarity.

12 VOLT SYSTEMS TEST

After completion of the unit, the 12 volt electrical system shall undergo a battery of tests as listed in NFPA 1901. These tests shall include, but not be limited to:

- Reserve capacity test
- Alternator performance test at idle
- Alternator performance test at full load
- Low voltage alarm test

Certification of the results shall be supplied with the apparatus at the time of delivery.

TAIL LIGHTS

There shall be a Whelen 600 series LED tail light assembly installed on each side of the rear of the apparatus. Each assembly shall include one (1) red LED stop/tail combination light model number 60BTT, one (1) amber LED model 60A00TAR turn light with arrow and one (1) clear LED backup light model 60C00WCR. The lights shall be mounted in a chrome plated four (4) light composite housing. The remaining slot in the housing shall be filled with a warning light specified in the warning light section.

MIDSHIP TURN SIGNALS

There shall be two (2) Truck-Lite model 21 LED midship auxiliary/turn signal lights installed. One (1) light shall be located in the rub rail on each side of the body.

BODY GROUND LIGHTING

There shall be Grote, model 61E41, white 4" round LED lights installed beneath the apparatus in areas where personnel may be expected to climb on and off of the apparatus. The lights shall illuminate the ground within 30" of the apparatus to provide visibility of any obstructions or hazards. These areas shall include, but shall not be limited to, side running boards and the rear step area.

The lights shall be activated when the parking brake is engaged or when the transmission is placed in reverse.

CLEARANCE LIGHTS

There shall be Grote model 65282 red LED clearance lights installed in the outside corners of the rear bumper and a Truck-Lite 35741R ID Bar Cluster located in the lower middle portion of the rear as necessary to be in full compliance with applicable ICC and DOT codes and regulations. Clearance reflectors shall be placed on the apparatus to be in full compliance with applicable ICC and DOT codes and regulations.

Upper Zone A, Lightbars (2), Chassis Supplied

UPPER ZONE C

There shall be two (2) Whelen B6 LED Series rotating/warning beacons installed in Upper Zone C, high at the rear of the apparatus. The combination lights shall incorporate an L31 series beacon and a 700 series warning light in a polished aluminum housing. The high profile beacons shall incorporate thirty two (32) Super-LEDs, an optic hard coated polycarbonate lens, and a metalized reflector with clear optic collimators. The hard coated lenses shall provide extended life/luster protection against UV and chemical stresses. The four (4) conformal coated PC boards shall provide additional protection against environmental elements. The high profile beacons shall include 28 Scan-Lock™ patterns including four (4) simulated rotating patterns and synchronized features.

The lower level warning lights shall incorporate eight (8) Super-LEDs, an optic hard coated polycarbonate lens, and utilize a metalized reflector with integrated TIR hybrid optics for maximum output. The hard coated lenses shall provide extended life/luster protection against UV and chemical stresses. The conformal coated PC board shall provide additional protection against environmental elements. The self-contained warning lights shall have 14 Scan-Lock flash patterns including steady burn and hi/low power.

The L31 dome lenses shall be sealed to a die cast aluminum base with an “O” ring gasket assembly. The 700 series warning light lenses shall be fitted with foam in place gasket assembly to the die cast aluminum base to provide additional protection against environmental elements. The solid state beacon light shall be vibration resistant.

The driver's and officer's side beacons shall both have red LED's and red lenses.

LOWER ZONE WARNING LIGHT PACKAGE

There shall be two (2) Whelen 600 Series Super-LED® lights with chrome-plated flange installed in the lower zones B & D, one each side. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The conformal coated PC board and sealed lens/reflector assembly shall provide additional protection against environmental elements. The solid state warning lights shall be vibration resistant.

There shall be two (2) Whelen 600 Series ROTA-BEAM Super-LED® lights with chrome-plated flange installed in Lower Zone C, on the upper rear face of the apparatus. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The conformal coated PC board and sealed lens/reflector assembly shall provide additional protection against environmental elements. The solid state warning lights shall be vibration resistant.

The lower zone warning lights shall all have red LED's and red lenses.

TRAFFIC ADVISOR™

There shall be one (1) Whelen model TAL65 LED Traffic Advisor™ installed on the apparatus. The traffic directional light shall contain six (6) medium intensity LED lamps in a black low profile flat style housing.

There shall be a Whelen, model TACTL5 traffic advisor control head provided with the Traffic Advisor™. The control head shall be housed in a rugged extruded aluminum case and shall offer four (4) programmable sequence flash patterns.

The traffic directional light shall be recess mounted in the rear of the body.

There shall be one (1) air horn button provided on the driver's side pump panel. The button shall be red in color and included a label reading "AIR HORN".

WHELEN 12V SCENE LIGHT

There shall be one (1) Whelen, model 6SC0ENZR, 600 Series LED Opti-Scene light with 8-32 degree optics installed on the apparatus. The light shall be surface mounted and installed in a chrome flange.

The lights shall be located on the centered side face of the body on the driver's side.

The driver's side scene light(s) shall be controlled by a switch located on the V-Mux. The light(s) shall be controlled by one (1) switch. The switch shall be labeled "LEFT SCENE."

WHELEN 12V SCENE LIGHT

There shall be one (1) Whelen, model 6SC0ENZR, 600 Series LED Opti-Scene light with 8-32 degree optics installed on the apparatus. The light shall be surface mounted and installed in a chrome flange.

The lights shall be located on the centered side face of the body on the officer's side.

The officer's side scene light(s) shall be controlled by a switch located on the V-Mux. The light(s) shall be controlled by one (1) switch. The switch shall be labeled "RIGHT SCENE."

GENERATOR

There shall be a Harrison, model 10.0MCR-16R hydraulic driven generator installed on the apparatus. The continuous duty rating of the generator shall be 10,000 watts, 42/83 amps, 120/240VAC volts. Current frequency shall be stable at 60 hertz.

The system shall be designed and assembled by a company with no less than 10 years experience in the manufacture of hydraulic driven generators. The system shall be tested prior to shipping and shall be accompanied with a test report. The generator shall be tested at various loads from no load to full load to ensure reliable power delivery at various loads.

The motor/generator shall be placed in a frame, which affords protection to the components and provides a unitized mounting module containing the motor/generator, reservoir, oil cooler, filtration, and an on/off manifold containing a cross port check valve allowing the unit to be started and shut down remotely. The generator shall be a commercial type with a heavy duty bearing and of brushless design to ensure low maintenance. No brushes or slip rings shall be allowed. The reservoir shall include an oil level sight gauge, oil temperature gauge, fill cap, oil filter, and a venturi boost unit to provide positive pressure to the pump suction port. The generator and motor shall be close coupled and aligned using a Morse taper with a through bolt to secure the motor to the generator. No two (2) bearing generators shall be used.

The system must be capable of producing the rated full power when driven from the vehicle PTO from idle to maximum engine speed.

The hydraulic motor and pump shall be of axial piston design to provide low internal

leakage and a high degree of frequency stability. No gear pumps or motors shall be used. The pump shall match the system with the proper orifice, pressure compensator, and load sense settings to provide stable output regardless of engine rpm or electrical load demands.

The system shall be capable of normal operations using a commonly available ATF fluid, such as GM Dextron II or equivalent. All fluid service points shall be in close proximity to the reservoir for ease of scheduled maintenance.

The system shall be warranted for a period of not less than two (2) years or 2000 hours, whichever should come first.

GENERATOR DISPLAY

There shall be a FROG D, model FR800-4812, provided with the generator. The FROG D shall automatically sense a generator signal and begin displaying information. The digital meter display shall constantly monitor and display voltage, frequency (accurate to within 1 decimal point), and current draw on two separate lines. The display shall be capable of displaying total accumulated run time hours when the MODE button is pressed. This information shall be stored in a non-erasable memory.

There shall be a remote start switch installed on the pump panel for the generator.

GENERATOR PTO CONNECTION

The hydraulic pump for the generator system shall be connected to the chassis transmission through a "Hot Shift", electrically engaged power-takeoff system. The control to engage and disengage the power-takeoff system shall be installed in the chassis cab.

The Harrison generator shall be located above the pump module.

GENERATOR COOLING FAN

To provide adequate cooling for the generator, an auxiliary cooling fan and ductwork shall be fabricated and installed. There shall also be an updraft because of the location of the generator.

12 CIRCUIT NON-GFI LOAD CENTER

There shall be a 120/240 volt load center incorporated into the 120/240 volt wiring system. The load center shall include adequate circuit breakers to protect the loads specified on the apparatus. The entire 120/240 volt electrical system shall be installed in strict compliance with NFPA 1901. This shall include all testing, labeling, wiring methodology, and dimensional requirements. Certification of compliance shall accompany the apparatus at the time of delivery. All 120/240 volt A.C. Wiring shall be done in accordance with NFPA 1901 as well as nationally accepted electrical codes.

BRANCH CIRCUIT OVERCURRENT PROTECTION

Over current protection devices shall be provided for circuits in accordance with NFPA 1901. The load center shall be equipped with a non-GFI two pole main breaker when the six or more individual branch circuits are present. Over current protection devices shall be marked with labels to identify the function of the circuit they protect.

The generator load center shall be located on the forward bulkhead of the L1 compartment.

ELECTRIC CORD REEL

There shall be Akron Brass electric rewind cord reel installed on the apparatus. The cord reel shall be equipped with a universal frame that will allow the 12 volt motor to be mounted in four (4) different positions. All metal parts, except for the electric motor and sprocket teeth, shall be powder painted red. All hardware shall be stainless steel. The cord reel disks shall have rolled edges to prevent sharp edges. The cord reel shall include the solenoid, switch and circuit breaker. The reel shall be covered by an Akron Brass five (5) year warranty. Rollers shall be supplied to prevent damage to the electrical cable if pulled in any direction.

The cord reel shall be equipped with 200' of yellow STW Seoprene 10/3 wire installed with a cable stop to prevent damage to cable fittings.

JUNCTION BOX

There shall be an Akron Brass Extenda-Lite, model EJBX, back lighted electrical junction box equipped with four (4) electrical receptacles, two (2) per side. Each receptacle shall be equipped with a spring loaded snap cover. The cord reel shall be hardwired to the cast aluminum junction box to supply power to the four (4) receptacles. An extension cord shall be connected to the junction box through a heavy-duty water resistant strain relief and flexible extender. Each side of the junction box shall be fitted with polypropylene faceplates, which are backlighted, so that plug orientation to the receptacles is quick and easy to align.

The junction box shall be equipped with an Akron Brass model CS cord stop.

There shall be one (1) NEMA 5-20R, 120 volt, duplex, 3-wire, straight blade (household type) receptacle installed on the junction box. The receptacle shall have a 20 ampere rating and include a spring-loaded weather resistant cover if mounted in an exterior location.

There shall be one (1) NEMA L5-15R, 120 volt, single, 3-wire, twistlock receptacle installed on the junction box. The receptacle shall have a 15 ampere rating and include a spring loaded weather resistant cover if mounted in an exterior location.

There shall be one (1) NEMA L5-20R, 120 volt, single, 3-wire, twistlock receptacle installed on the junction box. The receptacle shall have a 20 ampere rating and include a spring loaded weather resistant cover if mounted in an exterior location.

There shall be one (1) NEMA L5-20R, 120 volt, single, 3-wire, twistlock receptacle installed on the junction box. The receptacle shall have a 20 ampere rating and include a spring loaded weather resistant cover if mounted in an exterior location.

The cord reel shall be located in the dunnage compartment.

A tread plate mounting bracket to hold the junction box shall be included.

FIRE RESEARCH 120V TELESCOPING SCENE LIGHTS

There shall be two (2) Fire Research Spectra LED series, model SPA510-K20, top mount pull up telescopic lights installed on the apparatus. Each light pole shall be

anodized aluminum and have a knurled twist lock mechanism to secure the extension pole in position. The extension poles shall extend 4' and rotate 360 degrees. A 3-1/2" round mounting flange shall be provided. Wiring shall extend from the pole bottom with a 4' retractile cord.

Each lamphead shall have sixty (60) ultra-bright white LEDs, 48 for flood lighting and 12 to provide a spot light beam pattern. They shall operate at 120 volts AC, draw 2 amps, and generate 20,000 lumens of light. Each lamphead shall have a unique lens that directs flood lighting onto the work area and focuses the spot light beam into the distance. Each lamphead angle of elevation shall be adjustable at a pivot in the mounting arm and the position locked with a round knurled locking knob. Each lamphead shall be no more than 5-3/8" high by 14" wide by 3-3/4" deep and have a heat resistant handle. The lampheads and mounting arms shall be powder coated. The LED scene lights shall be for fire service use.

The two (2) lights shall be located rearward on top of the pump module, one (1) on each side.

Each light shall be controlled at the pump panel with it's own individual switch.

105' AERIAL LADDER CONSTRUCTION STANDARDS

The aerial ladder shall be of the rear mount design with the turntable mounted directly over the rear axles of the apparatus, and the ladder extending toward the front of the apparatus when in the bedded position. The aerial ladder shall be comprised of four sections and shall extend to a nominal height of 105' at 72 degrees, measured in a vertical plane from the top rung of the fly section (not including the egress) to the ground.

OPERATIONAL ENVELOPE/REACH

The aerial ladder shall have an operations range of -8 degrees elevation to +72 degrees elevation.

A minimum horizontal reach of 101.5' shall be measured from the turntable centerline to the outermost rung on the outermost fly section, with the aerial at full extension and at 0 degrees elevation.

Reach and height shall be measured in accordance with the requirements set forth in NFPA 1901, latest edition.

STRUCTURAL MATERIAL

The primary load support members of the ladder shall be constructed of certified 100,000 PSI yield strength (minimum) steel tubing. Each section shall be trussed diagonally, vertically, and horizontally using welded steel tubing. All critical points shall be reinforced for extra rigidity and to provide a high strength to weight ratio.

All ladder rungs shall be constructed of A606 Type 4 certified steel tested per ASTM A370 standards. A606 Type 4 exhibits superior corrosion resistance over regular carbon steel as a result of the development of a protective oxide film on the surface. A606 Type 4 shall meet a minimum 6.0 Atmospheric Corrosion Factor. The ladder rungs shall be round and welded to each section utilizing "K" bracing for torsional rigidity.

PRIMARY DIMENSIONS

The inside dimensions of the ladder shall be as follows:

- Base Section - 40.250"
- First Fly Section - 33.500"
- Second Fly Section - 27.750"
- Last Fly Section - 22.500"

The height of the handrails above the center line of the rungs shall be as follows:

- Base Section - 28.875"
- First Fly Section - 24.875"
- Second Fly Section - 21.375"
- Last Fly Section - 17.375"

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 NFPA 1901 and these specifications.

AERIAL DEVICE SAFETY FACTOR AND RATED CAPACITY

The purchaser desires to purchase with these specifications, an aerial device with a minimum 2.0:1 safety factor 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 + the rated capacity of 750 lbs. at the tip of the aerial; while flowing 1500 GPM, at a 90 degree angle to ladder centerline; with the structural load supporting members of the aerial device at either; an ambient temperature of 75 degrees F or an elevated temperature of 350 degrees F- thereby exhibiting a minimum 2.0:1 safety factor in all feasible operational conditions. These capabilities shall be valid and true when the apparatus is deployed in the unsupported configuration, based upon 360 degree rotation, up to full extension, and at any degree of elevation (-8 to +72) that the aerial can achieve.

AERIAL DEVICE SAFETY FACTOR SERVICE LIFE

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 2.0:1 for a "Safety Factor Service Life" of up to 20 years minimum.

AERIAL SPECIAL LABELS

Legible, permanent signs shall be installed in positions readily visible to the operator to provide operational directions, warnings, and cautions. The signs shall describe the function of each control and provide operating instructions.

Warning and caution signs shall indicate hazards inherent in the operation of the aerial device. These hazards shall include, but shall not be limited to:

- Electrical hazards involved where the aerial device does not provide protection to the personnel from contact with, or near proximity to, an electrically charged conductor.
- Electrical hazards involved where the aerial device does not provide protection to ground personnel who might contact the vehicle when in contact with energized electrically charged conductors.
- Hazards from stabilizer motion.
- Hazards that can result from failure to follow the manufacturer's operating instructions.

AERIAL DEVICE SPECIFICATION PLACARD

A permanent label shall disclose the following information relative to the aerial device:

- Make
- Model
- Insulated or non-insulated
- Serial number
- Date of manufacture
- Rated capacity (s)
- Rated vertical height
- Rated horizontal reach
- Maximum hydraulic system pressure
- Hydraulic oil type and capacity
- All other appropriate labels to ensure safe operation of the aerial device shall be permanently affixed in conspicuous locations.

THIRD PARTY NON-DESTRUCTIVE TESTING

Welds shall be tested using two (2) non-destructive methods by a third party inspection firm. Steel and aluminum ladders, at a minimum, shall have all welds tested using two (2) separate NDT methods.

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 have 100% of all structural welds tested using dye penetrant method and visual method. Manufacturers who rely only on visual inspection (performed in-house or by any third party) as a primary method of testing shall not be considered and their bid shall be rejected.

STRUCTURAL SAFETY FACTOR

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 to 1 safety factor specified by NFPA 1901. Devices that have not been certified by an engineer that is independent of the manufacturer shall not be acceptable.

NFPA AERIAL STABILITY FACTOR AND TESTING

A one and one half to one (1.5:1) stability factor shall be provided. 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.

Following are specific descriptions of what tests are to be performed, and conditions they shall be performed under. The aerial manufacturer shall strictly adhere to these tests and conditions as set forth in these specifications and NFPA 1901.

For both of the following tests, the only obstructions to a full 360 degree rotation with the aerial at 0 degrees elevation and full extension shall be presented by the apparatus itself (if any), and NOT external obstructions at the manufacturer's test location(s). This mean that the aerial device manufacturer shall ensure that the testing grounds present no obstruction (trees, buildings, etc..) to the full 360 degree rotation at 0 degrees elevation and full extension, which may cause the need to raise the aerial to clear the obstruction.

Additionally, the apparatus shall be tested for stability only after the entire apparatus is complete. This requirement is specified in NFPA 1901 as the apparatus being in "service ready condition". There shall be No Exception to this requirement due to the fact that it would be unlikely that actual weight distribution could be accurately simulated for the stability testing. "Counter weighting" shall not be allowed under any circumstance in place of the actual body and equipment.

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 is in compliance with these specifications. Specifically, the aerial device shall be placed on level ground with the stabilizers deployed per manufacturer recommendations. The aerial device then shall have 1.5 times the rated capacity placed at the tip of the aerial, with the device at full extension and at 0 degrees elevation; which is the most stringent configuration. The device shall be rotated 360 degrees, raising and lowering 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 is in compliance with these specifications. Specifically, the aerial device shall be placed on a 5-degree downward slope with the stabilizers deployed per manufacturer recommendations. The aerial device then shall have 1.33 times the rated capacity placed at the tip of the aerial, with the device at full extension and at 0 degrees elevation; which is the most stringent configuration. The device shall be rotated 360 degrees, raising and lowering 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 permanently deform.

RUNG COVERS

Each rung shall be covered with secure, heavy duty, deep serrated rubber sheathing. Attachment of the sheathing to the rung shall be by mechanical means and an adhesive application. Under no circumstance shall the rung covers turn when a rung is at ambient temperature (75 degrees F) or at an elevated temperature (350 degrees F); there shall be No Exception to this requirement for the safety of persons climbing the ladder sections.

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.

HEAVY DUTY LADDER TRAVEL SUPPORT

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 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 attached to the torque box for added stability.

The ladder rest shall be illuminated for night time operation. The illumination light shall automatically turn on with the aerial master switch.

CRADLE INTERLOCK SYSTEM

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 that allows the ladder to be lifted from the cradle when the aerial is set up in the "Short-Jacked" configuration.

ELEVATION SYSTEM

Two (2) double acting lift cylinders shall be utilized to provide smooth precise elevation from 8 degrees below horizontal to 72 degrees above horizontal. The lift cylinders shall have a 6" internal diameter (bore) and a 2.5" 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, so as to limit 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 degrees 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 (2)

sets of Siamese hydraulic cylinders and cables. Each set shall be capable of operating the ladder in the event of a failure of the other. The extension cylinders shall each have a 3.5" internal diameter (bore) and a 1.5" 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 will 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.

MAINTENANCE FREE SHEAVE BEARINGS

The aerial sheave bearings shall be made with continuous wound PTFE and high-strength fibers encapsulated in an lubricated, high temperature epoxy resin. This material shall be corrosion-resistant, have a high load capacity, and be self-lubricating.

It shall also be resistant to shocks, misalignment, and wear. The bearings shall not require lubrication. Aerial cable systems that require extensive maintenance, and constant lubrication, are not desired. NO EXCEPTIONS.

IGUS® ENERGY CHAIN

The electrical cable, hydraulic hose and/or air hose shall be routed through the interior of the structural tubing of the ladder sections as well as utilizing Igus® energy chain. The energy chain shall be routed through the inside section of the vertical side walls of the aerial ladder device. The cable and/or hose routing shall use one or both bottom cord rectangular tube(s) on the base section of the ladder and also the bottom cord rectangular tube(s) on the last ladder fly section. The ladder sections between the base and last fly shall utilize the energy chain in order to route all electrical cables and hose lines.

The energy chain shall travel within a carrier shield, which is fabricated out of 16 gauge anodized aluminum material. Each model of energy chain used shall be adequately sized to fit the application.

Rollers, which are located in the lower portion of the ladder section(s), shall be constructed out of a nylon plastic material that is specifically designed for these types of applications. Spacer pads, made from the same material as the rollers, shall be installed and evenly spaced in order to hold the Igus® energy chain within the specifically designed carrier shield(s).

The electrical cables used to transfer power up to the ladder tip shall be Igus® Chain Flex cables. These cables are specially designed for the Igus® energy chain system and custom fit for each aerial apparatus. If applicable, the hydraulic hose(s) and air hose(s) shall be Parker Hannifin® with a rating of 2,500 PSI.

Igus® Energy chain enables travel of up to 130 feet, is virtually wear free and offers

extremely quiet operation. Igus® energy chain is very well suited to resist the harsh environmental conditions by being able to withstand extreme temperatures and is also UV resistant.

AERIAL CABLE DIAMETERS

The extension/retraction cables shall be as follows:

- Second Section: .50" diameter
- Third Section: .38" diameter
- Fly Section: .31" diameter

CERTIFIED CABLE SWAGED SHACKLES

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

WEAR PADS/BEARING SURFACES

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 sides of the slide pads where adjustment screws come into contact with 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 BEARING

A 44 inch diameter external tooth, swing circle bearing shall be used for the rotation system. The bearing shall provide 360 degree continuous rotation. The bearing shall be designed specifically for the aerial device in lieu of the aerial device being designed to accommodate a particular bearing.

The turntable shall be bolted to the bearing using forty (40) 5/8" SAE grade 8 bolts. The bearing shall be bolted to the base support structure with sixty (60) 5/8" SAE grade 8 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 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 torqued 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 stops 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 gear box 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 it shall be installed so that it does not 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 gear box 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.

ROTATION INTERLOCK SYSTEM

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 a stabilizer is not sufficiently extended (short-jacked) to provide full tip load rating, the system shall prevent the aerial from being rotated more than 12 degrees past the front or rear center line 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 degrees of the front or rear center line of the apparatus. The rotational speed shall remain reduced throughout an arc of approximately 20-degrees 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.

An override system, activated by pull knobs within the main turntable control pedestal, shall be provided that allows the operator to rotate the aerial into the non-recommended (short-jacked) side of the apparatus, should the situation absolutely demand it.

Pull knobs shall be utilized to activate the manual override. Once the manual override is activated the aerial shall be capable of rotating to the side where a stabilizer is not fully deployed.

AERIAL STOW OPERATION INTERLOCK SYSTEM

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 a rear mounted 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-degrees 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.

CAB COLLISION PROTECTION INTERLOCK

The apparatus shall be equipped as a standard with a cab collision protection interlock. This interlock shall be enabled while rotating the aerial device at elevations as low as, or lower than the cab of the apparatus.

Should the operator accidentally rotate the aerial device toward the cab at an elevation low enough to cause a collision with the cab, the interlock shall automatically stop rotation of the aerial at a point that is within a few degrees of the cab.

A manual override shall be provided that will override the interlock system.

APPARATUS BODY DAMAGE CONTROL INTERLOCK SYSTEM

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-degrees, left or right, from the center of the ladder support. Once this rotation point is reached, full range downward movement (to minus 8 degrees) 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.

Rotational speed shall be reduced by approximately 50% when the aerial is rotated to within a minimum of 10 degrees of a body avoidance stopping point. Aerial rotation shall automatically stop before the aerial contacts the body of the apparatus.

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 eliminate the possibility of damage to components such as telescopic lights that are in a raised position.

A manual override shall be provided that will override the interlock system.

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.

"THRU-DRIVE" HYDRAULIC PUMP

The hydraulic system shall be supplied by a pressure compensated, load sensing, variable gallonage type pump. The pump shall provide adequate fluid volume to allow all ladder functions to operate simultaneously, without noticeable loss of speed. The pump shall supply oil only when the ladder is in motion, thereby preventing overheating of the hydraulic oil.

The pump shall be a "thru-drive" design. This design shall be provided for applications that require a power source for additional hydraulically operated accessories or tools.

An interlock shall be provided that allow operation of the aerial device PTO shift only after the chassis spring brake has been set and the chassis transmission has either been placed in the neutral position or the drive position if the driveline has been disengaged from the rear axle.

The Thru-Drive shall be setup so the generator shall be operable while the chassis transmission is in "Drive".

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 tank shall have an approximate capacity of 50 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 to 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 3 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 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.

HYDRAULIC PRESSURE GAUGE

There shall be a 2-1/2" Innovative Controls brass-case 5,000 PSI, pressure gauge located at the ground level control station to monitor the hydraulic system pressure. The gauge shall be liquid filled to prevent gauge shock when the hydraulic system is energized. The liquid shall not be vulnerable to freezing in subzero temperatures.

EMERGENCY PUMP

The apparatus shall be equipped with one (1) 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 (2) control switches for this emergency pump shall be provided. One switch shall be installed at each one of the following two (2) control stations; the turntable control console and the stabilizer control station. The switch shall be labeled EPU.

Each control 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.

HYDRAULIC SWIVEL

The aerial ladder shall be equipped with a swivel at the turntable. The swivel shall connect the hydraulic lines from the hydraulic pump and reservoir to the aerial control bank at the turntable, above the point of rotation.

The swivel shall connect all the electrical circuits through the rotation point. A minimum of thirty-two (32) collector rings shall be provided.

The swivel shall allow for 360 degrees of continuous rotation of the aerial device with no loss of speed or capacity in functions.

ANGLE INDICATOR

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 degrees 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 backlit for visibility in low light conditions.

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 5-foot 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.

SPECIAL TOOLS PACKAGE

Special 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 (1) 1/2" drive, torque wrench
- One (1) 1/2" drive, 15/16" socket
- One (1) 1/2" box end wrench
- One (1) 9/16" box end wrench
- One (1) set of Allen wrenches (5/64", 3/32", 1/8", 5/32", 3/16", 7/32", 1/4")

The aerial manufacturer shall provide the special tools package above as standard equipment.

MANUAL ROTATION DRIVE TOOL

As required by NFPA 1901, one (1) manual rotation drive tool shall be provided as a means to rotate the turntable in the unlikely event of power loss. This drive tool shall be provided as standard equipment.

TORQUE BOX

A "torsion box" sub frame shall be installed on the chassis frame rails, integral with the stabilizers. The torque box shall be constructed of 3/8" steel plate with the exception of the turntable area which shall be 1/2" steel plate. The standard dimensions of the torque box shall be 43" wide x 26" high x 248" long, these dimensions may vary. The torque box sub frame assembly shall be capable of withstanding all torsional and horizontal loads when the unit is on the stabilizers. The torque box shall be bolted in place to the chassis frame rails using forty (40) 5/8" SAE grade 8 bolts with nuts.

The torque box shall have a section modulus of 516.9 In^3 and a resistance to bending moment of 18,611,273 inch pounds.

The aerial torque box shall be painted with PPG polyurethane enamel paint. The color shall be (Black) PPG# MTK 9000.

FRONT AND REAR STABILIZERS

Two (2) sets of stabilizers shall be installed for stability. Each set of stabilizers shall have a 18' spread. Both sets shall be an extending box beam "H" style.

The front stabilizers shall be located directly behind the chassis cab rear wall. The stabilizers shall be an integral part of the torque box. A heavy-duty undersling assembly shall attach the front stabilizers to the front portion of the torque box. The undersling assembly shall be constructed of 6" x 10" x 1/2" square tubing, 1/4" and 3/8" steel gussets and 1/2" mounting plates. The overlap of the undersling and the torque box shall be a minimum of 24". The bottom side of the tubes shall contain a truss assembly that shall maximize the torsional strength of the undersling assembly.

The front stabilizers and torque box shall be attached to the truck frame in six (6) separate locations, three (3) each side of the apparatus, utilizing 1/2" steel plate. The mounting plates shall be located directly under the front stabilizers utilizing eight (8) grade 8 .625" size bolts per side, under the front torque box area utilizing six (6) grade 8 .625" bolts per side and at the rear stabilizer area utilizing six (6) grade 8 .625" bolts per side.

The rear stabilizers shall be located directly behind the chassis rear wheels. The stabilizers shall be an integral part of the torque box.

The stabilizers shall be of the double box tube design with jack cylinders that have a 5" internal diameter (bore) and a 2.5" diameter solid cylinder rod. The jack cylinders shall be equipped with integral holding valves, which shall hold the cylinders either in the stowed or the working position, should a charged line be severed at any point within the hydraulic system.

Vertical jack cylinder rods shall be fully enclosed by a telescoping inner box to protect the cylinder rods, seal glands and pistons against damage from nicks, abrasion, and chrome damage. All vertical stabilizer cylinders shall be removable through the top of the box tube. The inner double box system shall be further designed to stabilize the column load imparted upon the cylinder rod, thereby also protecting against damage which may occur from lateral loading which may be caused by side slopes, shifting or sliding of the apparatus on icy or unstable surfaces, sudden sinking of one or more jack pads, or on scene collision while the aerial device is deployed. Vertical stabilizers that require cylinders to be removed from the bottom, or have the vertical stabilizer cylinders exposed, shall not be acceptable.

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.

Each extending style stabilizer shall have a polished stainless steel stabilizer cover. The cover shall be adjustable to allow for a proper fit.

The stabilizers shall not include mechanical stabilizer pin locks, pin storage holders, or pin holes machined in the stabilizer extending beams.

STABILIZER STROKE

The stroke of the stabilizers shall be a minimum of 25". The stabilizer pad shall be maintained at a stored height of approximately 12" to 15" (dependent on required ground clearance and angle of departure) resulting in a minimum ground penetration of 10" or greater.

STABILIZER FINISH

The extending front/rear stabilizer beams, inner jack tubes, and stabilizer pads shall be wheel-o-braided to remove any mill scale or contamination. The individual components shall then 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.

The outer tubes shall be finished with a water-based, high quality, single component acrylic primer. The primer color shall be flat black.

STABILIZER EXTENSION SYSTEM

Extension of the front and rear horizontal beams shall be activated by dual extension cylinders, which shall each have a 2" internal diameter (bore) and a 1.25" diameter cylinder rod. The extension cylinders shall be totally enclosed within the extension beams to prevent damage to the rod and hoses. The extension beams shall be 6.00" x 8.00" x .375" wall steel tubing with a .62" steel plate welded to the top and bottom of each beam.

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 (2) 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 (1) on each side of the tubes.

There shall be one (1) manual angle level gauge located on the rear of the apparatus. The gauge shall have a sight bubble that will measure the side-to-side angle of the apparatus in 2 degree increments.

There shall be one (1) manual angle level gauge located on the driver's side of the apparatus, near the rear. The gauge shall have a sight bubble that will measure the fore-to-aft angle of the apparatus in 2 degree increments.

ELECTRIC / HYDRAULIC STABILIZER CONTROLS

The stabilizer controls shall be located at the rear of the apparatus. Two (2) stations shall be installed, one (1) on each side at the rear, arranged so that the operator has full view of the stabilizer being positioned. All stabilizer control functions shall be of the electric paddle joystick style. The make and model of the joystick 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 either to the stabilizer circuit or the turntable and ladder circuit, but not both simultaneously.

A stabilizer deployment warning alarm, activated by the stabilizer mode, 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.

The stabilizer controls shall each be accessible through a painted aluminum door.

GROUND CONTROL STATION

A control station shall be located at the rear of the apparatus in an easily accessible area. The control panel shall be illuminated for night time operation. 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 weather proof compartment shall be furnished behind the control panel and contain the aerial circuit breakers, interlock components and control circuit distribution terminals. The control station shall be accessible through a painted aluminum door.

The stabilizer controls and ground control station surfaces shall be fabricated from 3mm thick solid core aluminum composite panel with double-sided painted aluminum outer surfaces bonded to a solid polyethylene core, and shall include an Innovative Controls graphic overlay. The overlay shall be Innovative Controls design and supply a second-surface printed UV and scratch-resistant polycarbonate graphic overlay backed with UL 969-compliant outdoor adhesive.

AUXILIARY STABILIZER PADS

An auxiliary pad for additional load distribution on soft surfaces shall be supplied for each stabilizer. The pads shall be constructed of ultra-high molecular weight composite material that is a minimum of 1" thick with a minimum surface area of 576 square inches. The auxiliary pads shall be stored in locations that are readily accessible.

STABILIZER COVER WARNING LIGHTS

There shall be one (1) Whelen model 60R02FRR super LED flashing light installed on each extending stabilizer cover panel, for a total of four (4). These lights shall be red in color and activated by the aerial master switch.

STABILIZER ARM WARNING LIGHTS

There shall be eight (8) Whelen model 5GR00FRR LED red flashing lights mounted on the stabilizer beams. Each stabilizer beam shall include two (2) lights, one (1) facing forward and one (1) facing rearward. The lights shall be mounted inboard of vertical jack tubes. The warning lights shall be activated by the aerial master switch.

STABILIZER WORK LIGHTS

There shall be two (2) Truck-Lite, model 81380, LED clear flood lights shall be provided at each stabilizer location to illuminate the surrounding area. The lights shall be activated by the aerial master switch.

TURNTABLE

The turntable shall be designed in such a manner as to allow a generous working area, regardless of the position of the aerial. The aerial has a maximum elevation of 72-degrees. The turntable shall allow ample working room, within the perimeter hand-rail with the aerial positioned at maximum elevation. The turntable shall also be designed to allow for the most efficient use of space on the apparatus body.

The turntable shall be a minimum of 95" side to side and 95" forward to aft.

It shall be covered with Tread-Grip® Safe-Deck™ pattern decking to allow the walking surface to shed liquids with unparalleled ease and comply with NFPA intent, so as to provide secure footing for the operator in all weather conditions.

A downward lip shall "skirt" the turntable decking around the entire circumference to provide protection from hazards.

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.

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, thereby ensuring structural integrity.

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 regressing to and from the aerial base section, might place their hand(s).

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 qualified mechanic.

TURNTABLE HANDRAILS

There shall be three (3) handrails, each shall be of one piece construction and provide large sweep corners at the edge of the turntable. Each shall be 42" high and shall be constructed from knurled stainless steel. The handrails shall be installed around the rear 180 degree perimeter of the turntable for operator and personnel safety. Each individual handrail shall be secured to the turntable by the use of two (2) 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.

There will be two (2) openings in the handrails for access from the ladders.

There shall be two (2) stainless steel safety chains with carabiner type ends installed in the gaps between the handrails. The chains shall be permanently attached at one end.

TURNTABLE WORK LIGHTING

The turntable shall be lighted for night time operation with a minimum of Three (3) Whelen model 0AC0EDCR LED angled work lights, which shall be automatically activated by the aerial master switch (day or night). The work lights shall be so positioned that the light shall be directed toward the decking. The lights shall have integral chrome hoods to keep light from glaring upward into the operator's eyes.

An additional Whelen LED light shall be mounted in the front access door of the control stand.

AERIAL HOUR METER

There shall be an hour meter installed at the turntable control station connected to the system engagement control for the aerial. The meter shall register the total hours of aerial use for scheduling periodic maintenance.

TURNTABLE CONTROL CONSOLE

The turntable control console shall be located on the turntable, on the driver's side of the apparatus. The console shall be illuminated by an On-Scene Night Axe LED light with mounting clips for night time operation and have a hinged weather cover. A pressurized gas filled cylinder shall be furnished on the cover to hold it in the open position. The gas filled cylinder shall assist in closing the cover automatically when it is positioned over center. The console surface shall be angled toward the operator so controls may be viewed and operated ergonomically. Rubber bumpers shall be provided so that when the control console lid is closed, the lid and the control panel will be protected from each other (no metal to metal contact).

Three (3) handles for the ladder hydraulic functions (elevation, rotation, and extension) shall be installed at the control console. The controls shall be manual for safety and durability reasons. A cast alloy plate with openings cast into it for the ladder hydraulic function levers to extend through, shall be provided to encircle the aerial ladder hydraulic function levers. The function of each control lever shall be cast into the plate under the appropriate lever. 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.

The control console surface shall be fabricated from aluminum, and shall include an Innovative Controls graphic overlay. The overlay shall be Innovative Controls design and supply a second-surface printed UV and scratch-resistant polycarbonate graphic overlay backed with UL 969-compliant outdoor adhesive.

A hinged 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 inner components for inspection purposes. A recessed work light shall be provided in the access door. There shall be a hinged access door provided on the outboard side of the control panel. The door shall be provided with a spring loaded, slotted head latch. The opening allow shall access to the electrical components for service purposes.

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 and Electrical System
- Panel Light Mounted in Cover
- Ladder Overload Warning Horn
- Monitor Function Controls
- Intercom with Controls
- Operators Load Chart
- Warning Signs

AL-11 AERIAL INFORMATION SYSTEM (LADDER)

Aerial Logic Display

The aerial shall be equipped with a 7” / 178mm color transmissive TFT LCD display located at the turntable control console. The display shall be viewable in direct sunlight, with a resolution of WVGA, 800 x 480 pixels, 16-bit color and an aspect ratio of 16:9. The display shall feature backlighting of LED, 1000 nit typical brightness (40,000 h lifetime). The display shall include an internal microprocessor Freescale IMX. 375 32bit, 532 MHz utilizing a QNX operating system. The display shall have a minimum 2 GB RAM flash memory and 128 Mbytes SDRAM. The Display shall support J1939 and NMEA 2000 protocols.

For protection against extreme environmental conditions connections shall utilize 2 Ampseal 23 pin connectors AMP770680-1 and AMP770680-4. User inputs shall be accomplished utilizing 14 tactile buttons located directly on the display. The display shall be capable of operating -40º C to +85º C and a minimum IP67 rating front and back. For maximum protection the display case shall be constructed of Polycarbonate capable of Random vibration, 7.86 Grms (5.2000 Hz), 3 axis and a shock of +/- 50G in 3 axis.

The display will gather ladder positional data from an array of sensors. This data will not only be displayed for the device operator, but the rotation and elevation sensors will also be used to protect the body, cab, and installed components from collision damage caused by the aerial device.

Soft Keys

Columns of vertical keys shall be located to the left and/or right of the display. The soft keys correspond to the soft key commands and allow you to make selections with a gloved hand. Icons shall be displayed on the screen adjacent to the soft key and will change according to the options available for the screen being displayed.

Screens

The display shall provide the operator with critical aerial information and switching of aerial electrical components in an easy to read format:

- Main Aerial Logic Screen - The following information shall be displayed on the aerial logic display.
- Extension Retraction % – Digital readout shown 0% - 100%
- Ladder Angle -15 to 90 Degrees (Operational range of Aerial -7 to +72 Degrees)
- Rotation Position – 0 - 360 Degrees
- Ladder load % - Display Live loads acting on the aerial structure shown in 0 - 100%
- Breathing Air – 0-6000 Psi (This option available only if optional breathing air has been specified)
- Bed Zone Alignment Light – When the aerial is aligned and within the bed zone the indicator shall change to a bright color to indicate it is safe to bed the aerial.
- Rung alignment light – When the aerial Rungs of each section are aligned the indicator shall change to a bright color to indicate the rungs are aligned to provide safer climbing of the aerial.

Soft keys located on each side of the display shall be programmed to allow the operator to quickly change screens to view the following:

- Positional Waterway – Label shall read “Water tower” or “Rescue”, depressing this soft key shall allow the user to select what section the water way will be positioned. When “Water Tower” is displayed the waterway shall be affixed to the uppermost fly section of the aerial. When “Rescue is displayed the waterway shall be affixed to the next lower section. (This option available only if optional positional waterway has been specified)
- Creeper Control Enable – Label shall read “Creep Master” depressing this soft key is a momentary switch to allow creeper controls to be used at the tip of the aerial ladder. When the soft key is depressed the indicator shall change to a bright color to indicate the creeper controls at the tip have been activated. (This option available only if optional creeper controls have been specified)
- High Idle – Label shall read “High Idle” depressing this soft key shall increase engine RPM to the chassis pre-set high idle, depressing the button again shall return engine RPM to the chassis pre-set idle. The indicator shall change to a bright color to indicate the high idle has been activated.
- Retraction Override - Label shall read “Retract Enable” depressing this soft key shall allow the aerial ladder to fully retract when in the overlap zone. Once the operator has verified that it is safe to retract the aerial and depresses the soft key the “Label” shall change to a bright color to indicate the aerial can be fully retracted.
- Emergency Power Unit - Label shall read “EPU” depressing this soft key shall activate the electric over hydraulic emergency power unit.

- Engine Information Screen – An icon depicting an engine shall be displayed next to the soft key, depressing this button shall allow the operator to switch to the screen displaying chassis engine information.
- Day/Night Display Mode - An icon depicting the Sun or Moon shall be displayed next to the soft key, depressing this button shall switch the display to from a bright format for daytime use or a subdued format for nighttime use to maintain better nighttime vision of the operator.

Lighting /Customer Information Screen - An icon depicting a light bulb shall be displayed next to the soft key, depressing this button shall switch the screen from its’ current screen to the screen to control lighting on the aerial.

Lighting / Customer Information Screen

The following information shall be displayed on the aerial logic display.

- Customer name
- Production number
- Aerial device type
- Aerial device Model#
- Aerial Device Serial Number

- Rated Vertical height
- Rated Horizontal Reach

- Rated Capacity
- Contact information for the Fire Apparatus Manufacturer, Information shall include Name, Address, Phone number and Website

Soft keys located on each side of the display shall be programmed to allow the operator to quickly change screens to view the following:

- Panel Light - Label shall read “Panel light” depressing this soft key shall control lighting to illuminate the control station located on the turntable.
- Tip Lights - Label shall read “Tip Lights” depressing this soft key shall control the 12v lights located at the tip of the aerial ladder.
- Tracking Lights - Label shall read “Track Lights” depressing this soft key shall control the 12v lights located on each side of the base section of the aerial ladder.
- Blue Rung Lighting - Label shall read “Ladder Lights” depressing this soft key shall control the 12v LED lights used to illuminate the climbing area of the aerial for night time operations. (This option available only if optional blue rung lighting has been specified)
- Main Aerial Logic Screen – An icon depicting an aerial apparatus shall be displayed next to the soft key, depressing this button shall allow the operator to switch to the screen displaying aerial information.
- Day/Night Display Mode - An icon depicting the Sun or Moon shall be displayed next to the soft key, depressing this button shall switch the display to from a bright format for daytime use or a subdued format for nighttime use to maintain better nighttime vision of the operator.
- Engine Information Screen – An icon depicting an engine shall be displayed next to the soft key, depressing this button shall allow the operator to switch to the screen displaying chassis engine information.

Chassis Engine Information Screen

- Engine coolant temperature
- Oil pressure
- Transmission temperature
- Fuel Level
- Battery Voltage
- Engine RPM
- Engine Warnings – To include: Check Engine, Stop Engine, DPF Regeneration Required, Regeneration Status and High Exhaust Temperature

Soft keys located on each side of the display shall be programmed to allow the operator

to quickly change screens to view the following:

- Main Aerial Logic Screen – An icon depicting an aerial apparatus shall be displayed next to the soft key, depressing this button shall allow the operator to switch to the screen displaying aerial information.
- Lighting /Customer Information Screen - An icon depicting a light bulb shall be displayed next to the soft key, depressing this button shall switch the screen from its current screen to the screen to control lighting on the aerial.
- Day/Night Display Mode - An icon depicting the Sun or Moon shall be displayed next to the soft key, depressing this button shall switch the display to from a bright format for daytime use or a subdued format for nighttime use to maintain better nighttime vision of the operator.

SYSTEM LOCK CONTROL

A push/pull systems engagement control shall be installed at the turntable control console. 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 engagement control is in the "RUN" position. In the "LOCK" position, the engine speed shall return to the normal idle RPM and the hydraulic system be de-energized.

RETRACTION OVERRIDE SYSTEM

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.

There shall be a retraction override switch programmed into the AL-11 system at the turntable console position.

LOAD SENSING AL-11 SYSTEM

There shall be indication for the load sensing system programmed into the AL-11 system at the turntable control console.

AERIAL LADDER LOAD CHART

There shall be a load chart 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.

AERIAL COMMUNICATION SYSTEM

There shall be an Atkinson Dynamics two (2) station communication system provided between the aerial tip and the turntable control console. The communication system shall be a two way system with the communication speaker at the tip requiring no

operator attention to transmit or receive. The transmitting and receiving volume controls shall be located at the turntable control console.

TRACKING LIGHTS

There shall be two (2) Fire Research SoBrite LED, model SRA100-07A, compact ultra bright lights installed low on the front of the cradle, on the base section of the ladder, one (1) each side. Each lamphead shall have three mounting holes to mount the light directly to a horizontal or vertical surface. Wiring shall extend from the rear of the lampheads.

Each lamphead shall have 22 ultra-bright white LEDs to provide a spot light beam pattern. They shall each operate at 12/24 volts DC, draw 5/2.5 amps, and generate 7,000 lumens of light. The lampheads shall have a unique lens that focuses the spot light beam into the distance. Each lamphead shall weight less than 2 1/2 pounds and be powder coated. The LED scene lights shall be for fire service use.

The tracking lights shall be controlled through the AL-11 system.

EGRESS

A removable bolt on 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.

When the ladder is at 0 degrees elevation, the rungs on the egress shall be on a plane of -11 degrees. This shall provide a smoother transition onto the ladder from the tip, when it is at a high angle elevation.

Additionally, the egress shall have handrails that match the fly section handrails for an unnoticeable transition between the two. The egress handrails shall have a radius design at the tip to eliminate two corner joints, increase strength, and provide a pleasing appearance.

The rungs on the egress shall be held to the same design load criteria as the rungs of the aerial ladder sections. This mean that each egress rung shall be able to support a design load of 500 lbs. minimum, distributed across the rung, as specified in NFPA 1901. This shall be in excess of that required by the aforementioned standard. No Exceptions shall be allowed to this requirement.

AERIAL LADDER CREEPER CONTROLS

There shall be a remote ladder creeper control at the tip of the fly section. The control shall consist of three (3) spring loaded, triple pole double throw, return to center switches, one for each main ladder function. Each function switch shall be labeled on a black and white label that is located adjacent to the switches. Each switch shall be encircled by a rubber boot to protect the switch box 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.

A momentary switch shall be provided in the AL-11 system at the lower turntable control

console to activate the creeper control system. When the button is held in the "on" position, power shall be available to the person at the tip and they shall be able to adjust the aerial with the creeper controls. When the button is not depressed, the creeper system will be de-energized.

FLY SECTION FOLDING STEPS

One (1) 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 order to meet NFPA requirements that state the operator's feet not protrude through the outer most fly section, a kick plate constructed of Morton Cass 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 require that rubber gaskets shall be installed under the mounting surface where the step is secured to the aerial ladder section with certified structural fasteners.

FLY SECTION LOAD LIFTING/RAPPELLING EYES

The aerial ladder shall be equipped with two (2) load lifting/rappelling eyes at the tip of the fly section. The load lifting/rappelling eyes, as a pair, shall be rated not to exceed the tip load of the ladder structure.

FLY SECTION MOUNTED AXE

There shall be an axe mounting bracket installed on the fly section. A strap shall be provided to secure the axe in the bracket.

There shall be one (1) Fire Hooks Unlimited, model FAP-6, pick head axe provided in the bracket. The axe shall have a fiberglass handle.

AERIAL WIRING

The AC wiring up the ladder shall be Thermoplastic Elastomer (TPE) control cables and shall be highly flexible with very fine copper stranding. The cables shall have a center core strain relief for high tensile strength. The conductors shall be braided in bundles around the high tensile strength core. The outer jacket shall be gusset-filled, pressure-extruded, oil-resistant, bio-oil-resistant, PVC-free, halogen-free, and UV-resistant with low temperature flexibility. The cables shall have a minimum-bending radius of not greater than 5x the outer total diameter of the cable while moving.

120V RECEPTACLE

There shall be one (1) NEMA L5-20R, 120 volt, single, 3-wire, twistlock receptacle installed on the officer's side of the ladder tip. The receptacle shall have a 20 ampere rating and include a spring-loaded weather resistant cover if mounted in an exterior location. The receptacle shall be wired to the onboard generator.

FRC SOBRITE LED TIP LIGHT

There shall be one (1) Fire Research SoBrite LED, model SRA100-07A, compact ultra bright light shall be installed. The lamphead shall have three mounting holes to mount

the light directly to a horizontal or vertical surface. Wiring shall extend from the rear of the lamphead.

The lamphead shall have 22 ultra-bright white LEDs to provide a spot light beam pattern. It shall operate at 12/24 volts DC, draw 5/2.5 amps, and generate 7,000 lumens of light. The lamphead shall have a unique lens that focuses the spot light beam into the distance. The lamphead shall weight less than 2 1/2 pounds and be powder coated. The LED scene light shall be for fire service use.

The light shall be located on the driver's side of the aerial tip.

FIRE RESEARCH SPECTRA TIP LIGHT

There shall be one (1) Fire Research Spectra, model SPA570-K20-ON, LED tip light installed. The pedestal shall allow the lamphead to rotate 450 degrees and have a self adjusting friction brake to prevent arbitrary rotation. The pedestal shall have a round mounting base.

The lamphead shall have sixty (60) ultra-bright white LEDs, 48 for flood lighting and 12 to provide a spot light beam pattern. It shall operate at 120 volts AC, draw 2 amps, and generate 20,000 lumens of light. The lamphead shall have a unique lens that directs flood lighting onto the work area and focuses the spot light beam into the distance. The lamphead angle of elevation shall be adjustable at a pivot in the mounting arm and the position locked with a round knurled locking knob. The lamphead shall be no more than 5 3/8" high by 14" wide by 3 3/4" deep and have a heat resistant handle. The lamphead and mounting arm shall be powder coated. The LED scene light shall be for fire service use.

There shall be an on-off switch on the light head.

The light shall be located on the officer's side of the aerial tip.

The tip light(s) shall be controlled through the AL-11 system.

WATERWAY SYSTEM

A waterway system shall be provided consisting of the following components and features:

A 4-1/2" outside diameter pipe shall be connected to the water supply on one end and to a water swivel at the rotation point of the turntable. The swivel shall allow the ladder to rotate 360 degrees continuously while flowing water.

A 4" inside diameter pipe waterway shall be routed through the rotation point swivel up to the heel pin swivel. The heel pin swivel shall allow the water to flow to the waterway while elevating the aerial ladder from -8 degrees below to +72 degrees above horizontal.

The heel pivot pin shall not be integral with the waterway swivel at any point. The design of the waterway shall allow complete servicing of the waterway swivel without disturbing the heel pivot pin.

WATERWAY PIPE DIAMETERS

The integral telescopic water way system shall consist of a 5.0" outside diameter steel

pipe in the base section, a 4.5" diameter pipe on the next section, and a 4.0" outside diameter pipe on the third section, and a 3.5" outside diameter pipe in the fly section.

CP-84 CHROME PLATED WATERWAY

The CP-84 telescopic waterway shall be composed of high quality 84K PSI steel. The pipes shall be professionally prepared to accept a highly durable, hot dipped galvanizing coating. Preparation shall include degreasing as needed followed by wheel-o-braiding to remove any contaminates or scale.

Following preparation, each water pipe shall be hot-dipped galvanized. The pipes shall be completely submerged in the galvanizing bath to ensure 100% coverage, and intimate bonding of the galvanic coating to the steel. Following the dipping process, all dross shall be ground and the perimeter of the pipe shall be ground to a smooth finish.

Each pipe shall then be prepared to be heavily chrome plated. Materials (nickel/copper/chrome) used in the chrome plating process shall be of the highest purity to complete the chrome plating process. The chrome shall be polished to an extremely high luster.

The result of the preceding processes shall be an aerial waterway that is of unequalled quality and durability. The heavy galvanizing and chrome plating shall ensure that no corrosion occurs on the waterway, and that the outer surface remains smooth for long seal life. Additionally, the chrome plating shall aid in preventing nicks, scratches, and abrasions from occurring where they would otherwise easily occur with softer and more malleable aluminum tubes.

The waterway on the base section of the aerial device shall be galvanized with the process described above, followed by complete coverage utilizing PPG paint of job color.

POSITIONAL WATERWAY

The waterway shall be a positional or detachable type in order to allow the uppermost fly section to be clear of obstructions when using the aerial device for rescue purposes. It shall be designed in such a manner as to allow the master stream device to be affixed to either the tip of the last fly or to the end of the next lower section. The device shall be designed in such a manner that when it is in the forward position the monitor master stream device be connected to the tip of the ladder and when it is toward the back the device travel with the next lower ladder section. The connection for remote nozzle controls and electricity to the unit shall be permanent and not incorporate any spring loaded cable reels or electrical contact pads that can foul or become damaged allowing the monitor to become inoperable. In addition, the system shall require no external power supply such as a battery to operate the monitor.

There shall be a button provided on the AL-11 system at the turntable control console for the positional waterway. The button shall activate an electric actuator mechanism that will lock the monitor to the desired position. There shall be indication of the screen of the AL-11 that informs the aerial operator of the current position of the monitor. The verbiage on the screen for the two (2) positions shall read "Rescue" and "Water Tower".

WATERWAY RELIEF VALVE

A 3/4" 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,

which is normally caused by the capping of the monitor outlet. This valve in no way is to act as a relief for the total flow of the system.

WATERWAY DRAIN VALVE

A 1-½" drain valve shall be installed in the lower section of the aerial plumbing under the truck. The valve, when opened, shall drain the aerial waterway and lower plumbing.

AERIAL WATERWAY REAR INLET / OUTLET

There shall be a 4" aerial waterway inlet / outlet, with 4" plumbing, installed on the rear of the apparatus. The inlet / outlet shall be as low as possible to reduce the amount of weight on the fire hose coupling.

There shall be a 4" electric-over-air actuated butterfly valve provided located below the turntable in the plumbing to the aerial waterway. The valve shall allow the aerial inlet to be used to supply the aerial waterway when open, or as a discharge from the pump when it is closed. The valve shall be controlled from a switch located on the pump panel.

There shall be one (1) South Park, model IL3516AC, 4”NPT X 4”NST, chrome, waterway adapter bushing with screen provided.

There shall be one (1) Task Force Tips model #AH3ST-NP 30 degree elbow provided. For corrosion resistance, the elbow shall be constructed of hard coat anodized aluminum alloy, have a silver powder coat finish inside and out and include a polymer bearing ring for prevention of galvanic corrosion. The elbow shall be configured with a 5" swivel Storz coupling and a 4" female NH swivel rocker lug coupling.

There shall also be one (1) Task Force Tips model A01ST 5" Storz blind cap with lanyard provided.

TASK FORCE TIPS MONSOON RC ELECTRIC MONITOR

There shall be one (1) Task Force Tips Monsoon RC, model Y4-E21A-L, remote controlled electric monitor installed at the end of the aerial waterway. The monitor shall operate with 12-volt direct current and controlled by a monitor mounted switch panel with functions that control rotation, elevation and nozzle patterns. The monitor shall be compatible with optional wired and wireless control panels.

The electrical controls for the monitor shall be waterproof and utilize current limiting and position encoders to protect the drive train at the ends of travel. Monitor will be pre-wired to a control/connection box with 4 feet of wire such that the control/connection box is mountable to the ladder at a nearby location. Control box on monitor will contain a membrane switch panel for control of unit from top of ladder. Remote control/connection box will contain one TFT communications module which will allow the connection of a remote TFT toggle switch box (supplied separately if additional controls at the ladder tip are desired) simultaneously with allowing input from discreet signals that provide a positive 12-volt signal for actuation of each movement axis or can be easily reconfigured in the field to accept ground signals. The priority of operation will be set from the factory such that the discrete inputs always have control priority. An electrical connection for a TFT remote control nozzle shall be provided. The monitor shall be equipped with small override knobs for use in the event of power failure or electrical malfunction. The knobs control stainless steel worm gears for rotation and elevation adjustment.

The monitor shall have the following capabilities:

- Control box mounted to top center of monitor for maximum clearance;
- Override control shafts shall be short in length to provide maximum clearance;
- Small override knobs installed;
- Maximum operating pressure of 200 PSI

For resistance to corrosion the monitor shall be constructed from hard coat anodized aluminum with a silver powder coat interior and exterior finish. A threaded port for an optional pressure gauge shall be provided.

The monitor shall be designed with a unique waterway that minimizes the path of travel, reduces friction loss and turbulence, and produces a far-reaching water stream. The monitor shall be configured with a 4" ANSI 150 flange inlet and 3-1/2" male NH outlet.

PRIMARY REMOTE MONITOR CONTROL STATION (TURNTABLE)

Task Force Tips model # Y4E-RP primary control station for Monsoon remote control monitors shall be provided on the turntable. The control station shall be designed for flush panel mounting and include switches to control horizontal rotation, vertical elevation and nozzle stream pattern, oscillate and stow. The switch enclosure shall be weatherproof and utilize weatherproof components such as a membrane switch, silicone seal, and hardware with O-rings and liquid tight electrical connections with strain relief fittings. A 10-foot long incoming power connection cable shall be supplied and can be used as a central connection point for other wired or wireless controls or monitor position display.

REMOTE MONITOR TOGGLE SWITCH CONTROL STATION

Task Force Tips model # Y4E-TS auxiliary control station for Monsoon remote control monitors shall be provided at the tip of the ladder. The control station shall be designed for surface mounting and include switches to control horizontal rotation, vertical elevation and nozzle stream pattern. The control station will also include a circuit board to communicate with the Task Force Tips remote control monitor.

The switch enclosure shall be weatherproof and utilize weatherproof components such as, silicone seal, and hardware with O-rings and liquid tight electrical connections with strain relief fittings. A pre-connected 10-foot, four-conductor cable for power and communications shall be provided.

The monitor shall be powder-coated Silver by the monitor manufacturer and shall not be repainted by the OEM.

There shall be one (1) Task Force Tips, model M-ERP1500-NN, automatic master stream electric nozzle with 3-1/2" NH thread swivel base provided. The nozzle shall be capable of producing an excellent stream at any volume from 300 gpm to 1500 gpm. The nozzle shall feature an electric pressure adjustment knob, which allows the operating pressure to be adjusted to tactile detent settings between 70 and 120 psi. The nozzle shall include rubber bumper incorporate TFT "power fog" teeth for fully-filled, finger-free fog pattern. The nozzle shall be lightweight hard coat anodized aluminum for maximum resistance to corrosion and wear.

The monitor shall be capable of vertical positioning from -135 degrees to 0 degrees and horizontal positioning of 90 degrees from side to side, for a full 180 degree sweep.

MONITOR CONTROLS

The aerial master stream device shall have two (2) 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 aerial ladder. Each station shall have the capability of controlling the nozzle pattern as well as the horizontal and vertical position of the device.

2-1/2" AERIAL TIP DISCHARGE

There shall be a 2-1/2” 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 2000 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 2-1/2" NH male outlet installed, extended 4-3/4" from main valve. C2 and C4 shall have blind plugs installed. C3 shall have an External Automatic Drain Valve. All 2-1/2" NH male discharges shall have a 2-1/2" NH female by 1-1/2" NH male thread reducer and a 1-1/2" NH female cap with lanyard.

RUNG ILLUMINATION LIGHTING

The aerial ladder sections shall be equipped with permanently installed blue LED rung illumination lights. The lights shall be mounted on the inside of the ladder sections, facing inward; on each aerial section in a "staggered" configuration. The blue colored lens shall serve to illuminate climbing rungs without inducing any glare, which would hinder safety. Each light shall be equipped with an integral guard to protect it from damage. The light shall itself be positioned such that all light 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.

The rung lighting shall be controlled through the AL-11 system.

AERIAL LADDER SIGNS WITH DEMO OVERLAYS

There shall be two (2) signs, with demo overlays, measuring 16" tall x 133" long installed on the base section of the aerial ladder, one (1) on each side. The signs shall be fabricated of 1/8" aluminum plate. The signs shall be large enough to accept a maximum lettering size of 12" high.

The signs shall have overlays that are easily removable to allow the ladder signs to be changed quickly when the unit is sold.

BASE SECTION MOUNTED ROOF LADDER

There shall be one (1) roof ladder mounting bracket set provided on the outside of the base section, on the officer's side, for a roof ladder. 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 Line-X™. Stainless steel fasteners shall be employed where the ladder rack is bolted to the aerial section or ladder sign. The roof ladder shall be secured using a spring-loaded handle, which is easily lifted away from the roof ladder with a gloved hand for safe access.

One (1) Duo Safety, model 775-A, 14' aluminum roof ladder shall be provided. The ladder shall have a 750 pound duty rating and aluminum roof hooks that fold for storage.

BASE SECTION MOUNTED ROOF LADDER

There shall be one (1) roof ladder mounting bracket set provided on the outside of the base section, on the driver's side, for a roof ladder. 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 Line-X™. Stainless steel fasteners shall be employed where the ladder rack is bolted to the aerial section or ladder sign. The roof ladder shall be secured using a spring-loaded handle, which is easily lifted away from the roof ladder with a gloved hand for safe access.

One (1) Duo Safety, model 875-A, 16' aluminum roof ladder shall be provided. The ladder shall have a 750 pound duty rating and aluminum roof hooks that fold for storage.

FLY SECTION MOUNTED PIKE POLE

There shall be one (1) pike pole mounting bracket provided on the driver's side of the aerial fly section. A strap shall be provided to hold the pike pole in the bracket.

One (1) Nupla, model YPD-6, 6' fiberglass pike pole shall be provided. The pike pole shall be constructed of tubular fiberglass with reinforcement at critical stress points and a butt style handle.

CHASSIS PAINT

The two-tone chassis cab shall be painted by the chassis manufacturer.

BODY PAINT PREPARATION

After the body and components have been fabricated and assembled they then shall be disassembled prior to painting so when the apparatus is completed there shall be finish paint beneath the removable components. The apparatus body and components shall be metal finished as follows to provide a superior substrate for painting.

All aluminum sections of the body shall undergo a thorough cleaning process starting with a phosphoric acid solution to begin the etching process followed by a complete rinse. The next step shall consist of a chemical conversion coating applied to seal the metal substrate and become part of the aluminum surface for greater film adhesion.

After the cleaning process, the body and its components shall be primed with a High Solids primer and the seams be caulked.

All bright metal fittings, if unavailable in stainless steel or polished aluminum, shall be

heavily chrome plated. Iron fittings shall be copper under plated prior to chrome plating.

PAINT PROCESS

The paint process shall follow the strict standards as set forth by PPG Fleet Finish Guidelines.

The body shall go through a three-stage paint process: primer coat, base coat (color), and clear coat. In the first stage of the paint process the body shall be coated with PPG F3980 Low VOC / High Solids primer to achieve a total thickness of 2-4 mills. In the second stage of the paint process the body shall be painted with PPG FBCH Delfleet™ High Solids Polyurethane Base Coat. A minimum of two to three coats of paint shall be applied to achieve hiding. In the final stage of the paint process the body shall be painted with PPG DCU-2002 Clear Coat. A minimum of two to three coats shall be applied to achieve a total dry film thickness of 2-3 mills.

As part of the curing process the painted body shall go through a Force Dry / Bake Cycle process. The painted components shall be baked at 185 degrees for 3 hours to achieve a complete coating cure on the finished product.

HAND POLISHED

After the Force Dry / Bake Cycle and ample cool down time, the coated surface shall be sanded using 3M 1000, 1200, and or 1500 grit sandpaper to remove surface defects. In the final step, the surface shall be buffed with 3M super-duty compound to add extra shine to coated surface. No more than .5 mil of clear shall be removed in this process.

BODY COLOR

The body shall be painted with PPG High Solids Polyurethane Base Coat. The single tone body shall be painted (RED) PPG# FBCH-71096-ALT.

AERIAL COMPONENT PROTECTION / PAINT

All aerial device components above the rotation point that are not chrome plate bright 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 V.O.C. high solids non-isocyanate primer and finish painted with a Low V.O.C. extremely durable, single stage ultra high solids high gloss polyurethane paint. The support structure and components below the rotation point shall be painted black.

The extending stabilizer beams, inner jack cylinder protective tubes, and stabilizer pads shall be hot dip 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.

Following surface preparation, components shall be coated with Black water base self-etching coating. No Exceptions.

The high gloss polyurethane paint, which shall 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 2 hours to enhance durability and appearance. The temperature shall not be less than 180 degrees 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 with PPG Delfleet High Solids polyurethane enamel paint. The color shall be (White) PPG# FDGH - 2185.

AERIAL CORROSION PROTECTION

The majority of the internal structural members of the aerial structure shall be 100% concealed from oxygen. Totally sealed 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.

AERIAL LADDER EGRESS PAINT COLOR

The aerial ladder egress shall be painted with PPG Delfleet High Solids polyurethane enamel paint. The color shall be (Red) PPG# FDGH-4353.

LADDER SIGN PAINT COLOR

The ladder signs shall be painted to match the aerial ladder.

UNDERCOATING

The apparatus shall undergo a two (2) step undercoating process. The first step shall be a rubberized polyurethane base compound that is applied after the body has been primed. The materials used incorporate unused paint products to reduce the amount of waste released into the environment. This coat shall be applied to all hidden pockets and surfaces that shall not be visible after completion.

As a final step, the entire underside of the body shall be coated with a bituminous based automotive type undercoating when the apparatus is completed. During this application,

special care shall be taken to avoid spraying the product on air lines, cables, or other items that would cause normal maintenance to be hindered.

CORROSION PREVENTION

One (1) 3.75 ounce tube of Electrolysis Corrosion Kontrol (ECK) shall be provided to use whenever additional items are mounted to the apparatus.

ECK protects aluminum and stainless steel against electrolytic reaction, isolates dissimilar metals and gives bedding protection for hardware and fasteners. ECK contains anti-seizing lubricant for threads. ECK is dielectric and perfect for use with electrical connectors.

LINE-X® THERMOPLASTIC COATING

In designated areas, Line-X® XS-350, a two component spray-in-place thermoplastic polyurethane system shall be used for maximum protection of the body and equipment. Line-X® XS-350 is a 100% high performance aromatic solids pure Polyurea elastomeric membrane. The coating shall be a fast cure, textured surface, multi-purpose material designed for commercial and industrial applications. It shall exhibit excellent adhesion to the body and serve as a protective, abrasion resistant liner where applied.

The coating shall exhibit the following minimum typical physical properties:

Tensile strength - 3,432 PSI (ASTM D-412)
Elongation - 162% (ASTM D-412)
Tear Strength - 783 PLI (ASTM D-624)
Shore D Hardness - 60 +/-1 (ASTM D-2240)

TOUCH UP PAINT

One (1) two ounce bottle of acrylic enamel touch-up paint or two (2) touch up paint pens, if color is available, shall be supplied.

3" GOLD LEAF LETTERING

There shall be up to sixty (60) 22KT gold leaf letters provided and installed on the apparatus. The letters shall be approximately 3" tall with black outline and shadow.

10" REFLECTIVE LETTERING

There shall be up to thirty (30) reflective letters provided and installed on the apparatus. The letters shall be approximately 10" tall with black outline and shadow.

REFLECTIVE STRIPE TERMINATION

The NFPA reflective stripe located on the side of the apparatus shall terminate at the side of the front bumper.

There shall also be reflective striping provided on the front face of the bumper.

RUB RAIL REFLECTIVE STRIPING

There shall be 2" reflective striping installed in the rub rail channel. The reflective striping

shall be diamond grade quality material for increased visibility. The reflective shall be silver in color.

NFPA COMPLIANT REFLECTIVE STRIPING

Reflective striping shall be applied to the exterior of the apparatus in a manner consistent with NFPA 1901. It shall consist of a 1", 4", and a 1" wide stripe low across the front of the chassis and along the sides up to the first compartment on each side where it shall angle up and back to a point in the upper compartments where it shall then run level to the back edge of the body. There shall be a 1" gap provided between each of the stripes.

The color of the upper reflective striping on the apparatus shall be white.

The color of the main reflective striping on the apparatus shall be white.

The color of the lower reflective striping on the apparatus shall be white.

WHITE REFLECTIVE STRIPING ON STABILIZER BEAMS

There shall be a reflective stripe installed on the front and rear sides of the four (4) stabilizer beams. The striping shall be 4" and white in color.

CHEVRON COLOR - RED/FLUORESCENT YELLOW-GREEN

The chevron striping shall consist of 3M part numbers 1172 EC, red and 3983, fluorescent yellow-green.

Only 3M Diamond Grade™ VIP Reflective Striping shall be used. 3M Diamond Grade™ VIP Reflective Striping is a wide angle prismatic lens reflective sheeting designed for the production of durable traffic control signs and delineators that are exposed vertically in service. This sheeting is designed to provide higher sign brightness than sheetings that use glass bead lenses. It is intended to also provide high sign brightness in the legibility distance where other sheetings do not.

CHEVRON REFLECTIVE STRIPING ON REAR

In addition to the custom striping pattern supplied on the apparatus, there shall be additional reflective striping applied to the entire rear of the unit. The reflective striping shall cover at least 50% of the rear facing vertical surface per NFPA 1901. The striping shall consist of a solid base layer of reflective material and alternate between the exposed base layer material and durable, transparent, acrylic colored film. Each stripe shall be a minimum of 6" in width and shall be applied to the apparatus at 45° angle.

The chevron pattern shall include the ladder storage compartment doors. The torque box door shall be excluded from the chevron pattern.

TWO (2) YEAR PROTECTION PLAN - MATERIAL AND WORKMANSHIP WARRANTY

OEM installed purchased parts and fabricated parts shall be free of defects in material and workmanship for a period of two (2) years starting thirty (30) days after the original invoice date. For further details, please refer to the complete warranty document.

TEN (10) YEAR WARRANTY BODY STRUCTURAL INTEGRITY

The body shall be free of structural or design failure or workmanship for a period of ten (10) years or 100,000 miles starting thirty (30) days after the original invoice date.

FIFTEEN (15) YEAR TORQUE BOX SUPERSTRUCTURE WARRANTY

The torque box superstructure shall be free of structural or design failure or workmanship for a period of fifteen (15) years starting thirty (30) days after the original invoice date. For further details, please refer to the complete warranty document.

TWENTY-FIVE (25) YEAR AERIAL STRUCTURAL INTEGRITY WARRANTY

The aerial device shall be free of structural or design failure or workmanship for a period of twenty-five (25) years or 100,000 miles, starting thirty (30) days after the original invoice date. For further details, please refer to the complete warranty document.

TEN (10) YEAR AERIAL WATERWAY AND WATERWAY SEALS LIMITED WARRANTY

The aerial device waterway, including the waterway seals, shall be free of defects in design and workmanship for a period of ten (10) years starting thirty (30) days after the original invoice date.

TEN (10) YEAR STAINLESS STEEL PLUMBING LIMITED WARRANTY

The stainless steel plumbing and piping shall be free from corrosion perforation for a period of ten (10) years starting thirty (30) days after the original invoice date.

WATER TANK WARRANTY

The tank shall be complete with a lifetime warranty. The tank manufacturer shall mark the tank and furnish notice that indicates proof of warranty. For further details, please refer to the complete warranty document.

THREE (3) YEAR PAINT LIMITED WARRANTY

The apparatus body and pump house shall be free of blistering, peeling and any other adhesion defect caused by defective manufacturing methods or paint material selection for exterior surfaces for a prorated period of three (3) years starting thirty (30) days after the original invoice date.

Paint on the undercarriage, body interior (Line-X® coating included) or aerial structure related paint, if applicable, is covered only under the Standard One (1) Year Limited Warranty.

TEN (10) YEAR CORROSION PERFORATION LIMITED WARRANTY

The body exterior paint shall be warranted against corrosion perforation for a prorated period of ten (10) years starting thirty (30) days after the original invoice date.
For further details, please refer to the complete warranty document.

PUMP WARRANTY

The fire pump shall be warranted by Waterous for a period of five (5) years from the date of delivery to the fire department or five and one-half (5-1/2) years from the shipment date by Waterous, whichever period shall be first to expire. For further details, please refer to the complete warranty document.