Spartan branded badging and Logo's shall be supplied.

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. 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) drawings shall be supplied. The provided drawings can be printed to any paper size, but the scale will only be valid when printed to the paper size listed in the title block
- Drawings shall show five (5) views: left (drivers), right (officers), front, rear, and top
- OAL (overall length) in feet and inches. The estimated length shall be rounded up to the nearest inch
- OAH (overall height) in feet and inches. The estimated height shall be rounded up to the nearest inch
- Wheelbase in inches
- Pump house width in inches
- Front of the body to the centerline of the rear axle in inches
- Front and rear overhang in inches
- Angle of approach and departure
- Roll up doors will be shown in open position. Lap doors will be shown in the closed position
- Compartment dimensions shall be shown in a table on the drawing. The table shall display

1. Clear door opening - The width/height of the clear door opening
2. Interior dimensions - The interior compartment dimensions excluding any accessories or pockets (i.e. roll up door drums, hard suction hose pans, suspension pockets, etc.)
3. Divide heights - The measurement where the compartment changes from full depth to shallow depth
4. Compartment depths - Depth of the compartment with the door closed

- Ground ladders shall be labeled with a letter designation referring to the table for an explanation of the ladder
- No pump panel or instrument panel controls, discharges or inlets shall be shown. The panel space is to be left blank and labeled "Pump Panel"
- Rear plumbing, such as 2-1/2" discharges, rear steamers, and direct tank fills, shall be shown
- Water tank outline (if applicable)
- Water tank and foam cell fill towers (If applicable)

- Generator outline (if applicable)
- Warning lights
- D.O.T. lights

Text Block Items

- Chassis make/model
- Fire pump make/model
- Water tank capacity (if applicable)
- Foam cell capacity (if applicable)
- Body material
- Hose bed capacity in cubic feet (if applicable)

- Total compartment cubic feet
- Utilize an unique bid number
- Drawings shall be printed on white paper with black ink

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 in accordance with NFPA, current edition compliant aerial devices.

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

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 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 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 etc., 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 service 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 mounted, with due consideration to the 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 in accordance with NFPA, current edition requirements.

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 (if applicable), 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 to show the actual manufacturer's name, part number and description on all 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, Current Edition
- 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 in accordance with NFPA, current edition. 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 in accordance with NFPA, current edition. 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 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 noted as exceptions at the time of bid. 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 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 rejected.

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 within 25 seconds on a 0 percent grade
- Attaining a speed of 50 mph on 0 percent grade
- Maintaining a speed of at least 20 mph 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.

PROPOSAL SEQUENCE

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

AWARD OF CONTRACT

All bids submitted shall be valid 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, current edition
- 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.

ENGINE AVAILABILITY

If an L9 engine is NOT available or cannot be provided for that specific quote or build slot at time of production, the engine will automatically be upgraded and charged for an X12 (or the X10 engine) with all costs associated with the upgrade being passed on to the end user. No exceptions.

If a pre-2027 emission engine is NOT available at the time of build (starting production on January 1, 2026) the order will automatically be upgraded and charged for either the 2027 engine compliant Cummins X-10 or X-15, with all associated costs being passed on to the end user. No exceptions.

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

The National Fire Protection Association "Standard for Automotive Fire Apparatus", 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 latest edition. There are to be no exceptions to this requirement.

INSPECTION CERTIFICATE - NFPA COMPLIANCE

An OEM inspection certificate for the apparatus shall be furnished upon delivery. The purpose of this NFPA 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 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 the 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, 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 manufacturer's 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, 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 the 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 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

An owner's manual containing the construction, operation, and service documentation shall be provided on a USB Drive. One (1) copy of the USB shall be 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, ControlMaxx 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

A section of the electrical manual 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)

A section of the electrical manual 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)

A section of the electrical manual 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

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

AERIAL OPERATION/PARTS/MAINTENANCE MANUALS

One (1) printed aerial operation and maintenance manual shall be provided with the apparatus at the time of delivery. These manuals shall be written in a "step by step" format for ease of reference. One (1) USB shall be 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 DEMONSTRATION - (3) DAYS

A factory trained and authorized instructor shall provide three (3) consecutive days of on-site classes after apparatus acceptance.

Topics covered in the class shall include:

- General familiarization and demonstration of aerial device
- Aerial apparatus safety including a review of all safety devices, interlocks. and operational hazards
- Positioning and locating the vehicle for safe operations
- Chassis parking brakes and engagement of hydraulic system
- Deployment of stabilization devices and use of ground pads
- Operation of elevation, extension, and rotation of the aerial device
- Operation of waterway, nozzle, and other firefighting devices of aerial device
- Operation and use of breathing air system
- Specific aerial device maintenance and service areas for operators
- Shutdown and return to service operations
- Operation of tip controls and platform controls if equipped

Classes shall consist of presentations as well as hands-on demonstration.

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 is in accordance with NFPA, current edition. requirement of maintaining a stability of 26.5 degrees in both directions.

VEHICLE STABILITY

The apparatus shall comply with the requirements of NFPA, current edition 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 which 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, current edition.
- The apparatus shall be deemed a similar apparatus and meeting the intent of section 4.13.1.1.2 of NFPA, current edition.

INDEPENDENT THIRD PARTY PUMP CERTIFICATION

The fire pump shall be tested and certified by an 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 in accordance with NFPA, current edition. The pump shall be free from objectionable pulsation and vibration.

PUMP CERTIFICATION

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

ONLINE CUSTOMER INTERACTION

Smeal Holding LLC. shall provide the capability for online access.

The fire department shall be able to view digital photos of their apparatus in the specified phases of construction.

The following phases will be captured and displayed:

- Chassis arrival to the OEM
- Fabrication
- Pump and Plumbing
- Paint
- Assembly
- Completion of production

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

FINAL INSPECTION

The department/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 manner. After leaving the facility, all repairs or alterations will be performed by either the dealer or an OEM-approved service center.

MAXIMUM OVERALL HEIGHT

The overall height of the apparatus shall not exceed 138” (11'-6”) from the ground. This measurement shall be taken with the tires properly inflated and with the apparatus in the unloaded condition to ensure a maximum overall height. In order to provide the maximum overall height, proposed units using calculated weight as a means to achieve a lower overall height shall not be accepted. The measurement shall be taken at the highest point of the apparatus.

MAXIMUM OVERALL LENGTH

The overall length of the apparatus shall not exceed 451” (37’-7”).

WHEELBASE

The wheelbase of the apparatus shall not exceed 218".

ANGLE OF APPROACH

The angle of approach of the apparatus shall be a minimum of 8 degrees.

ANGLE OF DEPARTURE

The angle of departure of the apparatus shall be a minimum of 8 degrees.

SPARTAN METRO STAR CHASSIS

The chassis shall be a Spartan Metro Star.

EXHAUST MITIGATION DEVICE

The chassis supplied exhaust mitigation device shall be installed by the apparatus body manufacturer.

CHASSIS AIR LINES

All chassis air brake system lines and accessories supplied by or connected to the chassis air brake system shall be plumbed using DOT approved compression style brass fittings with compression sleeves and stainless steel inserts.

Pipe thread connections shall be sealed with thread sealant containing PTFE that is fast dry, flexible set thread sealant designed for high vibration environments and shall be compatible with all fluids that may exist, or be used in the maintenance of fire apparatus (including, but not limited to: water, DEF, diesel fuel, brake clean, fire suppression foam, engine coolant, motor oil, various greases, transmission fluid, hydraulic fluids, etc.) - TEFLON TAPE THREAD SEALANT SHALL NOT BE USED

All air systems shall be continuous endpoint-to-endpoint runs. HOSES SHALL NOT BE

EXTENDED USING ANY TYPE OF COUPLING SOLELY FOR THE PUPOSE OF LENGTHENING THE RUN OF HOSE.

The air system of the completed vehicle shall comply with FMVSS121.

MUD FLAPS

In addition to the chassis supplied front mud flaps, two (2) mud flaps shall be provided rearward of the rear axles on the apparatus.

RELOCATE CAB TILT

The cab tilt pendant shall be relocated as deemed best fit by the OEM.

The OEM will not add any flooring to the front bumper storage well.

A hazard warning circuit shall be tied to the circuit for the "open door" warning light in the chassis in addition to the vehicle display to alert the driver of an unsafe condition for moving the apparatus. The vehicle display shall have a specific screen to show the displayed alert. The screen shall show the apparatus in full driver's side, officer's side and rear views. The door, component or device that is not properly closed or stowed will be shown on the screen in the appropriate view. The light shall be illuminated automatically when the parking brake is not fully engaged and any of the following conditions exist:

- Any equipment compartment door that is not closed (excluding compartments with 4 cubic foot (0.1 cubic meter) or less of volume; or have an opening of 144 square inches (92,000 square mm) or less; or doors that do extend sideways beyond the mirrors or up above the top of the fire apparatus);
- Any ladder or equipment rack that is not in the stowed position;
- Any device or component that is permanently attached to the apparatus that is open, extended, or deployed in a manner that is likely to cause damage to the apparatus that has been specified as being tied to the hazard warning circuit.

A warning placard shall be near the warning light that reads "DO NOT Move Apparatus When Light Is On."

WATER TANK

The apparatus shall be equipped with a United Plastic Fabricating (UPF) 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 water tank shall be constructed of polypropylene sheet stock, a non-corrosive stress relieved thermoplastic material, black in color, and UV-stabilized for maximum protection. The tank shall be of a specific configuration and shall be 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 tank shall be fitted with removable lifting eyes designed with a 3:1 safety factor to facilitate easy removal.

TANK BAFFLES

The swash partitions shall be manufactured of natural color 3/8" PT2E polypropylene,

with the transverse partitions extending from approximately 4" off the floor to just under the cover and the longitudinal partitions extending 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, interlock with one another, and be welded to each other and the walls of the tank.

TANK SUMP

One (1) sump shall be provided in the bottom of the water tank, constructed of polypropylene, and located in the driver’s side front quarter of the tank. Tanks requiring a front suction shall incorporate a 4" schedule 40 polypropylene pipe with 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. An anti-swirl plate shall be located approximately 2" above the sump.

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 polypropylene and incorporate a three-piece locking design allowing for individual removal and inspection if necessary. The tank lid shall be recessed 3/8" from the top of the tank and welded to the sides and the longitudinal partitions for maximum integrity. The lid shall have hold downs consisting of 2" polypropylene dowels spaced a maximum of 30" apart. These dowels shall extend through the covers, ensuring the covers remain 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 water tank cradle shall be designed specifically for this apparatus. The cradle structure shall be supported by and welded directly to the top plate of the torque-box.

WATER TANK DRAIN

A 1-1/2" drain valve shall be provided in the pump compartment to drain the water tank. The valve shall include a locking lever to prevent accidental draining of the water tank when there is an external drain.

WATER TANK FILL TOWER

The tank shall have a combination vent and manual fill tower, marked "Water Fill", located at the driver’s side front corner of the tank. The fill tower shall be constructed of black 1/2" PT2E polypropylene and be a minimum dimension of 8" x 8" at the outer perimeter. The tower shall have a 1/4" thick removable polypropylene screen and a PT2E polypropylene hinged-type cover.

WATER TANK LEVEL GAUGE

One (1) Fire Research, model WLA300-A00, TankVision Pro 300 water tank level gauge shall be provided on the pump operator's control panel.

The gauge shall have nine (9) easy to see super bright RGB LEDs to show the tank volume. The display shall use a two-dimensional, two-element lens to refract the light from the LEDs to provide full 180° visibility for the level indication. The gauge shall start to flash when the tank volume is at 1/4 tank or less and use down scrolling LEDs to alert the pump operator when the tank is almost empty.

FRC MAXVISION WATER TANK LEVEL DISPLAYS

An FRC MaxVision water tank level strip light shall be installed on the driver's side and officer's side of the chassis cab by the chassis manufacturer. The OEM shall connect the datalink needed for all strips to mimic each other.

4" WATER TANK OVERFLOW

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

The water tank overflow shall be extended below the fuel tank and rear axle so the overflow does not dump or spray on top of either.

FOAM CELL

One (1) United Plastic Fabricating (UPF) 20 U.S. gallon foam cell shall be incorporated into the water tank. One (1) pressure/vacuum vent shall be installed and one (1) drain hose shall be 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.

The foam cell shall be designed for use with Class "A" foam.

The foam cell shall have a manual fill tower constructed of 1/2" PT3 polypropylene and shall be a minimum dimension of 8" x 8" outer perimeter. The foam fill tower shall be black in color, indicating the type of foam to be utilized and located on the officer’s side front corner of the water tank. The capacity of the cell shall be engraved on the top of the fill tower lid. 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 cell. A pressure vacuum vent shall be provided in the lid of the fill tower.

HOSE BED

The hose bed shall be located ahead of the turntable support structure behind the water tank. The hose bed shall extend backward, past the side of the turntable support, and exit at the rear of the apparatus through one (1) access opening. The access opening shall be free of obstructions that may interfere with the deployment and loading of hose. One (1) painted aluminum door shall cover the hose bed access opening. The door shall be a horizontally hinged lift-up design with a positive latch gas strut hold open device. A 1" stainless steel body trim piece shall be at the rear-bottom of the hose bed, to protect

the chevron striping when deploying hose.

The interior walls of the hose bed shall have an abraded aluminum finish.

The floor of the hose bed shall be constructed of Dura-Dek fiber reinforced plastic material to prevent the accumulation of water and to allow ventilation to aid in drying hose. 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 and slipping 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. The bright white coating shall be bakedon.

The hose bed shall contain the following hose load:

HOSE BED CAPACITY

The hose bed shall have a minimum capacity of 30 ft^3 of hose storage.

TOP / END COVERS

The top and/or end covers shall be provided and installed by the dealer/Customer. The customer shall sign a statement of exceptions.

HOSE BED LOADING LIGHTS

Two (2) OnScene Access LED hose bed loading lights shall be provided to illuminate of the hose bed area in accordance with NFPA, current edition. Two (2) shall be located as deemed best by the body builder unless stated in the shop note. The hose bed lighting circuit shall be activated when the parking brake is engaged.

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. 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) 2" x 2" square 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. 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 of 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.

SIDE COMPARTMENT DOORS

ROM roll-up doors shall be installed on each side body compartment, eight (8) total. Each door shall be a shutter type with slats that roll onto a spool at the top of the compartment. Each slat shall be equipped with nylon end shoes to assure operation without the need for constant lubrication. The door slats and tracks shall be wet painted by the door manufacturer to match the apparatus body.

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

DOOR HANDLES

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

PULL DOWN STRAP

There shall be vendor supplied pull down straps installed on each roll-up door.

REAR COMPARTMENT DOOR

One (1) horizontally hinged lap type compartment door shall be installed. 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. Rubber molding shall be installed in the overlap area of the door to ensure 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 recessed "D" ring type handle. A safety latch with striker plate shall be included with the door handle assembly.

Two (2) pressurized gas-filled cylinders shall be 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 the center.

The inner door face shall be painted the primary body color. The panels shall have a grade "B" paint finish, therefore it will not be buffed and may be subject to imperfections.

BODY COMPARTMENT LIGHTING

A total of sixteen (16) ROM LED compartment lights shall be installed in the body compartments. Each light shall feature solid state construction and be waterproof to IPX7 rating. The LED lights shall offer 250 lumens per 12" of lighting.

COMPARTMENT COATING

The interior of the body compartments shall be coated with gray Bedliner Coating unless otherwise specified. The coating shall be durable enough to withstand the everyday wear and tear of equipment removal and shifting.

COMPARTMENT AIR RELEASE

Each compartment shall be vented to help remove trapped air when closing the 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 underneath the apparatus.

SILL PROTECTORS

A stainless steel angle sill protector shall be installed on the bottom sill area of the compartment with a lap style door to aid in reducing paint damage from equipment. The sill protector shall be attached using permanent-bonding double-sided tape.

FUEL FILL

A fuel fill pocket shall be located in the rear wheel well area on the 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.

Fuel Tank Vent Line

The fuel fill vent line shall be attached to the hose barb using a hose clamp.

STANDARD WHEEL WELL STORAGE

The wheel well area of the apparatus shall be designed to additional components.

DRIVER'S (LEFT) SIDE BODY COMPARTMENTS

COMPARTMENT L1
A full height compartment shall be 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: 62"
- Width: 52"
- Depth: 14" Upper and 23" Lower
- Intermediate Divide Height: 30"

COMPARTMENT L2
A standard height compartment shall be 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: 28"
- Width: 28"
- Depth: 14" Upper and 14" Lower
- Intermediate Divide Height: 0"

COMPARTMENT L3
A standard height compartment shall be 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: 20"
- Width: 50"
- Depth: 14" Upper and 14" Lower
- Intermediate Divide Height: 0"

COMPARTMENT L4
A full height compartment shall be located behind 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: 51"
- Width: 27"
- Depth: 14" Upper and 23" Lower
- Intermediate Divide Height: 25"

L1 Components

COMPARTMENT STRUTS

Aluminum vertical strut channels shall be welded in the compartment. Two (2) struts shall be provided for any full depth portion and one (1) strut shall be provided for any shallow depth portion.

ADJUSTABLE SHELF

One (1) aluminum adjustable shallow-depth shelf shall be installed in the compartment. The shelf shall be constructed of 3/16" aluminum sheet with a minimum of 2" lips. The shelf shall have an abraded finish and shall be designed in such a manner as to allow liquids to readily drain.

L2 Components

COMPARTMENT STRUTS

Aluminum vertical strut channels shall be welded in the compartment. Two (2) struts shall be provided for any full depth portion and one (1) strut shall be provided for any shallow depth portion.

ADJUSTABLE SHELF

One (1) aluminum adjustable shallow-depth shelf shall be installed in the compartment. The shelf shall be constructed of 3/16" aluminum sheet with a minimum of 2" lips. The shelf shall have an abraded finish and shall be designed in such a manner as to allow liquids to readily drain.

L3 Components

COMPARTMENT STRUTS

Aluminum vertical strut channels shall be welded in the compartment. Two (2) struts shall be provided for any full depth portion and one (1) strut shall be provided for any shallow depth portion.

ADJUSTABLE SHELF

One (1) aluminum adjustable shallow-depth shelf shall be installed in the compartment. The shelf shall be constructed of 3/16" aluminum sheet with a minimum of 2" lips. The shelf shall have an abraded finish and shall be designed in such a manner as to allow liquids to readily drain.

L4 Components

COMPARTMENT STRUTS

Aluminum vertical strut channels shall be welded in the compartment. Two (2) struts shall be provided for any full depth portion and one (1) strut shall be provided for any shallow depth portion.

ADJUSTABLE SHELF

One (1) aluminum adjustable shallow-depth shelf shall be installed in the compartment. The shelf shall be constructed of 3/16" aluminum sheet with a minimum of 2" lips. The shelf shall have an abraded finish and shall be designed in such a manner as to allow liquids to readily drain.

DRIVER'S SIDE REAR WHEEL WELL POSITION - WL1

A three (3) air bottle compartment shall be installed in the forward portion of the rear wheel well area, on the driver's side. The compartment shall be a triangle design. The compartment door, flange, and hinges shall be constructed of stainless steel material. The door shall have a rubber gasket to create a 100% seal to protect the interior of the compartment. The storage compartment shall be a molded component that is assembled to the door and flange. The door shall be painted primary body color.

DRIVER'S SIDE REAR WHEEL WELL POSITION - WL3

A single extinguisher/water can compartment shall be installed in the rearward portion of the rear wheel well area, on the driver's side. The compartment shall be large enough to hold an extinguisher/water can up to 9" in diameter, with sufficient space for the discharge tube. The compartment door, flange, and hinges shall be constructed of stainless steel material. The door shall have a rubber gasket to create a 100% seal to protect the interior of the compartment. The storage compartment shall be a molded component that is assembled to the door and flange. The door shall be painted primary body color.

OFFICER'S (RIGHT) SIDE BODY COMPARTMENTS

COMPARTMENT R1
A full height compartment shall be 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: 62"
- Width: 52"
- Depth: 14" Upper and 0" Lower
- Intermediate Divide Height: 30"

COMPARTMENT R2
A standard height compartment shall be 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: 28"
- Width: 28"
- Depth: 14" Upper and 14" Lower
- Intermediate Divide Height: 0"

COMPARTMENT R3
A standard height compartment shall be 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: 20"
- Width: 50"
- Depth: 14" Upper and 14" Lower
- Intermediate Divide Height: 0"

COMPARTMENT R4
A full height compartment shall be located behind 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: 51"
- Width: 49"
- Depth: 14" Upper and 23" Lower
- Intermediate Divide Height: 25"

R1 Components

COMPARTMENT STRUTS

Aluminum vertical strut channels shall be welded in the compartment. Two (2) struts shall be provided for any full depth portion and one (1) strut shall be provided for any shallow depth portion.

ADJUSTABLE SHELF

One (1) aluminum adjustable shallow-depth shelf shall be installed in the compartment. The shelf shall be constructed of 3/16" aluminum sheet with a minimum of 2" lips. The shelf shall have an abraded finish and shall be designed in such a manner as to allow liquids to readily drain.

R2 Components

COMPARTMENT STRUTS

Aluminum vertical strut channels shall be welded in the compartment. Two (2) struts shall be provided for any full depth portion and one (1) strut shall be provided for any shallow depth portion.

ADJUSTABLE SHELF

One (1) aluminum adjustable shallow-depth shelf shall be installed in the compartment. The shelf shall be constructed of 3/16" aluminum sheet with a minimum of 2" lips. The shelf shall have an abraded finish and shall be designed in such a manner as to allow liquids to readily drain.

R3 Components

COMPARTMENT STRUTS

Aluminum vertical strut channels shall be welded in the compartment. Two (2) struts shall be provided for any full depth portion and one (1) strut shall be provided for any shallow depth portion.

ADJUSTABLE SHELF

One (1) aluminum adjustable shallow-depth shelf shall be installed in the compartment. The shelf shall be constructed of 3/16" aluminum sheet with a minimum of 2" lips. The shelf shall have an abraded finish and shall be designed in such a manner as to allow liquids to readily drain.

R4 Components

COMPARTMENT STRUTS

Aluminum vertical strut channels shall be welded in the compartment. Two (2) struts shall be provided for any full depth portion and one (1) strut shall be provided for any shallow depth portion.

ADJUSTABLE SHELF

One (1) aluminum adjustable shallow-depth shelf shall be installed in the compartment. The shelf shall be constructed of 3/16" aluminum sheet with a minimum of 2" lips. The shelf shall have an abraded finish and shall be designed in such a manner as to allow liquids to readily drain.

OFFICER'S SIDE REAR WHEEL WELL POSITION - WR1

A three (3) air bottle compartment shall be installed in the forward portion of the rear wheel well area, on the officer's side. The compartment shall be a triangle design. The compartment door, flange, and hinges shall be constructed of stainless steel material. The door shall have a rubber gasket to create a 100% seal to protect the interior of the compartment. The storage compartment shall be a molded component that is assembled to the door and flange. The door shall be painted primary body color.

OFFICER'S SIDE REAR WHEEL WELL POSITION - WR3

A single extinguisher/water can compartment shall be installed in the rearward portion of the rear wheel well area, on the officer's side. The compartment shall be large enough to hold an extinguisher/water can up to 9" in diameter, with sufficient space for the discharge tube. The compartment door, flange, and hinges shall be constructed of stainless steel material. The door shall have a rubber gasket to create a 100% seal to protect the interior of the compartment. The storage compartment shall be a molded

component that is assembled to the door and flange. The door shall be painted primary body color.

REAR BODY COMPARTMENT

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

HOT-DIP GALVANIZED STEEL BODY MOUNT SUB FRAME

The main body mount 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 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.

BODY RUB RAILS

Rub rails shall be installed beneath the compartment doors to protect the apparatus body from damage should the body be brushed or rubbed against another object. The rub rails shall be 2-1/2" x 1" , 3/16" aluminum channel. 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

Two (2) chrome plated tow eyes shall be 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. The liners shall match the material used to build the body. A sufficient clearance shall be provided in the wheel well to allow the use of tire chains when the apparatus fully loaded.

STAINLESS STEEL FENDERETTES

Two (2) stainless steel fenderettes shall be installed at the outboard edge of the rear wheel well area, one (1) 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 the 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

A 4" heat deflector shield shall be installed over the exhaust to aid in dissipating the heat to prevent exhaust heat from adversely affecting contents stored in the body.

LICENSE PLATE BRACKET

A license plate bracket shall be 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. TrimRite stainless is 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 fasteners.

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 accordance with NFPA, current edition.

Horizontal walkways shall have .080" aluminum tread plate overlays installed and vertical surfaces shall have .125" aluminum tread plate 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 and 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 lit.

TURNTABLE ACCESS LADDER

A "Smart" aluminum fold down access ladder shall be provided and installed at the left rear of the apparatus for access to the turntable, rearward of the side body compartments. The ladder rungs shall be constructed of a slip resistant stepping material.

The upper section shall be permanently secured to the body with a mechanical style hinge and fasteners that allow the ladder to extend down and out to the ground from the apparatus body. When deployed, the fold-down steps shall create a safe and comfortable climbing angle.

Two (2) gas cylinders shall be installed to assist in the deployment of the lower fold-down section. Access ladder rung illumination shall be provided during low light conditions.

If the step is not properly stowed and the transmission is placed into drive or reverse mode with the parking brake released, it shall activate the hazard light in the cab to alert the crew.

A grab handle shall be installed on top of the body at the rear of the apparatus.

A 6" Red / 6" White diamond grade reflective chevron shall be installed on each outboard side of the ladder. "THIS IS NOT A STEP" red reflective message shall be installed on the bottom of the last step in two directions so when the step is folded up you can read it from standing on top of the turn table or by standing on the ground.

FRONT TREAD PLATE OVERLAYS

A tread plate overlay shall be located on the front vertical areas of each side of the apparatus body.

And if applicable, a tread plate overlay shall be located on the rear face of each outrigger housing.

The overlays shall be located on the front of the body compartments.

FRONT BODY STEPS AND LIGHTING

Four (4) Innovative Controls folding steps (3004234-27-1-1-1-1-0) shall be located on the front of the driver'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 hand-hold 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.

Each step shall be a backlit polydomed Spartan Logo, a LED step light module and a bottom down-light module.

FRONT BODY STEPS AND LIGHTING

Four (4) Innovative Controls folding steps (3004234-27-1-1-1-1-0) shall be 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 hand-hold 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.

Each step shall be a backlit polydomed Spartan Logo, a LED step light module and a bottom down-light module.

A handrail shall be installed forward on the top of the body, on the driver's side.

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

GROUND LADDER STORAGE

The ground ladders shall be stored within the torque box and shall be removable from the rear of the apparatus. The ladders shall be fully enclosed so road dirt and debris cannot foul or damage the ladders. The ladders shall be stored in individual full-length slides so they can be removed individually.

The Little Giant ladder will be stored unfolded in the ladder rack.

The following ground ladders shall be supplied with the apparatus:

One (1) Duo-Safety, model 585-A, 10' aluminum folding ladder shall be provided.

One (1) Wing Enterprises, model 15187-882, 17' aluminum Little Giant Defender NFPA compliant ladder shall be provided.

Two (2) Duo-Safety, model 875-DR, 16' aluminum roof ladder with roof hooks on each end shall be provided.

One (1) Duo-Safety, model 1200-A, 28' aluminum two-section extension ladder shall be provided.

One (1) Duo-Safety, model 1225-A, 35' aluminum three-section extension ladder shall be provided.

PIKE POLE STORAGE

Six (6) aluminum tubes for the storage of pike poles shall be installed inside the torque box. The provisional tubes shall be for the dealer supplied 6', 8', 12' standard pike poles and for 6', 8' and 10' New York style pike poles, (1) each.

PIKE POLE STORAGE

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

The dealer supplied poles will be 4' D-handle.

PUMP COMPARTMENT

The complete apparatus pump compartment shall be constructed of a combination of structural tubing and formed sheet metal. The same materials used in the body shall be utilized in the construction of the pump compartment. The structure shall be welded utilizing the same A.W.S. Certified welding procedure as used on the structural body module. These processes shall ensure the quality of structural stability of the pump compartment module.

There shall be a tread plate overlay installed on the forward portion of the pump module. The center area will have an opening to access the pump for maintenance purposes. If a pump compartment heater is selected, there shall also be a screw on tread plate panel installed to close the center access area.

The pump compartment module shall be separated from the apparatus body with a gap. This gap is necessary to accommodate the flexing of the chassis frame rails that are encountered while the vehicle is in transit so that harmful torsional forces are not transmitted into the structural framework.

The pump module substructure shall be mounted above the frame to allow independent flexing to occur between the body and the chassis. Each assembly shall be mounted to the chassis frame rails with steel, gusseted mounting brackets. Each pump compartment mount bracket shall be mounted to the side chassis frame flange.

Each assembly shall have a two-part rubber vibration isolator. The isolator shall be of a specific durometer to carry the necessary loads of the pump module. The quantity of mounts utilized shall correspond directly to the anticipated weight being supported.

There shall be no welding to the chassis frame rail sides, web or flanges, or drilling of holes in the top or bottom frame flanges between axles. All pump module to chassis connections shall be bolted so that in the event of an accident, the body shall be easily removable from the truck chassis for repair or replacement.

PUMP COMPARTMENT LIGHTS

Two (2) 8" On-Scene Access LED lights shall be installed in the pump compartment. The lights shall be rated at 100,000 hours of service. The lights shall be waterproof and magnesium chloride resistant. The lights shall be enclosed in tough 5/8" Lexan tube. There will be a work light switch installed on the pump panel to activate the lights.

DRIVER'S SIDE RUNNING BOARD

A running board constructed of anti-slip tread plate, shall be installed on the driver's side of the pump module. The stepping area shall be as large as possible, overlapping the perimeter of the running board structure.

OFFICER'S SIDE RUNNING BOARD

A running board constructed of anti-slip tread plate, shall be installed on the officer's side of the pump module. The stepping area shall be as large as possible, overlapping the perimeter of the running board structure.

PULL-OUT PLATFORM

One (1) Innovative Industries pull-out platform shall be 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.

DUNNAGE COMPARTMENT

A dunnage compartment shall be located above the pump module. The dunnage

compartment floor shall be constructed of tread plate. The side walls inside the dunnage shall be abraded aluminum.

OFFICER'S SIDE DUNNAGE ACCESS PANEL

A black bedliner coated aluminum access panel shall be above the officer's side pump panel to allow access to the dunnage compartment. The vertically hinged panel shall be of the single pan design and shall be positively latched in the closed position utilizing (2) two compression latches. The door shall have a chrome suitcase handle installed between the compression latches. A gas strut shall be provided on the door. A stainless steel 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-ajar warning light circuit.

CONTROL PANEL

The driver's side of the pump enclosure shall be divided into two sections. The lower section shall contain all valve controls, primer controls, discharge relief valve controls (pilot valve), and other mechanical controls. 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 up 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. 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 removed 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 installed shall be equipped with connectors so they may be easily separated 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 Bedliner Coating 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 POLISH STAINLESS STEEL

Polish Stainless steel intake and discharge garnish rings shall be installed on the apparatus.

VERBIAGE TAG BEZEL ASSEMBLIES (Spartan Style)

Innovative Controls (Spartan Style) verbiage tag and bezels shall be installed. The bezel assemblies will be used to identify apparatus components.

SAFETY MESSAGE BEZEL ASSEMBLIES

Innovative Controls safety message and bezels shall be installed. The assemblies will be used to identify, instruct, or warn the operators.

The Innovative Controls verbiage and safety message 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 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 is in accordance with NFPA, current edition.

PUMP PANEL LIGHTING

The pump operator's control panel and the officer's side pump panel shall each be illuminated by On-Scene LED Access lighting. The pump panel lights shall become energized upon setting the park brake so the gauge information provided may be consulted. 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.

PUMP PANEL LIGHT SWITCH

An on/off switch shall be located on the operator pump panel to control the pump panel lights.

MIDSHIP MOUNT FIRE PUMP

The pump shall be a Waterous CSU 2000 U.S. GPM 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 with 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.

MECHANICAL SEALS

The pump shall be equipped with self-adjusting, maintenance free mechanical shaft seals that shall not require manual adjustment. These seals shall be designed in a manner such that they shall remain functional enough to permit continued use of the pump in the unlikely event of a seal failure.

ANODES

Four (4) Waterous Magnesium anodes shall be 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 1750 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 as per pump manufacture recommended guidelines; 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 a minimum of 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.

The pump system shift indicator lights on the operator's panel shall be incorporated with the pump pressure governor.

PRESSURE GOVERNOR

A Fire Research InControl series TGA400 pressure governor and monitoring display kit shall be installed. The kit shall include a control module, intake pressure sensor, discharge pressure sensor, and cables. The control module case shall be waterproof and have dimensions not to exceed 5 1/2" high by 10 1/2" wide by 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 a J1939 data bus or independent sensors. Outputs for engine control shall be on the J1939 data bus or engine specific wiring.

The following continuous displays shall be provided:

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

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

The program shall store the accumulated operating hours for the pump and engine to be displayed with the push of a button. 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 and a control knob located on the front of the control panel. There shall be a USB port located at the rear of the control module to upload future firmware enhancements.

Inputs to the control panel from the pump discharge and intake pressure sensors shall be electrical. The discharge pressure display shall show pressures from 0 to 600 PSI. The intake pressure display shall show pressures from -30 in. Hg to 600 PSI.

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

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, monitoring and master pressure display shall be programmed to interface with a specific engine.

INTAKE RELIEF VALVE

A Task Force Tips, model #A1850, pressure relief valve shall be installed on the suction side of the pump. The valve shall be factory preset and shall have an easy to read adjustment range from 90 to 300 PSI with easy to read 90, 125, 150, 200, 250, 300 PSI settings and an “OFF” position. Pressure adjustment can be made utilizing a 1/4" hex key, 9/16” socket or 14mm socket. For corrosion resistance the cast aluminum valve shall be hard coat anodized with a powder coat interior and exterior finish. The valve shall have a 2-1/2" male Victaulic discharge outlet. The valve shall be in accordance with NFPA, current edition. requirements for pump inlet relief valves. The unit shall be covered by a five-year warranty.

TRIDENT PRIMING PUMP

The priming pump shall be a Trident Emergency Products 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. A pressure protection valve shall be 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".

WATEROUS OVERHEAT PROTECTION MANAGER WITH INDICATOR LIGHTS AND BUZZER

A Waterous Overheat Protection Manager (OPM) shall be installed on the pump. The relief valve shall automatically relieve water from the pump when the temperature of the pump water exceeds 140°F. In addition, a warning light on the pump panel shall be triggered by a thermal switch when the water in the pump reaches 180°F. The warning light and a buzzer act as additional protection devices if the temperature inside the pump keeps rising although the valve is open. The valve shall automatically reset after activation.

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 MANUALS

Two (2) Pump Operation and Maintenance manuals shall be provided in digital format with the apparatus.

PUMP COOLING SYSTEM

A pump cooling system shall be provided on the apparatus. The cooling system shall keep the pump cool during long periods of pumping when water is not being discharged. The cooling system shall also be set up 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-temperature hose. The pump cooling lines shall be installed with one (1) line going from the discharge side of the water pump through a 3/4 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 3/4" 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 pump cooling system valve shall be controlled on operators panel, and shall be clearly labeled, "Pump Cooler".

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 1/2" 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.

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

The discharge gauges on the apparatus shall be 2-1/2" (63mm) diameter Innovative Controls TC Series (Temperature Compensation) pressure gauges. The gauges shall have a glass-filled nylon case, a clear scratch-resistant lens, and a highly-polished stainless steel bezel. The gauge shall be fully-filled with a synthetic mixture to dampen shock and vibration, lubricate the internal mechanisms, prevent lens condensation, and ensure proper operation from –40° F to +160° F.

The gauges shall meet or exceed ASME B40.100 Grade B requirements with an accuracy of +/- 1.5% full scale and include an internal thermal expansion bladder that allows the gauge fill to expand in high temperature environments. The gauges shall also include a KEM-X Socket Saver diaphragm in the stem to eliminate freeze-up and contain

a low temperature instrument oil that fills and protects the socket and bourdon tube.

Each discharge gauge shall include a line fitting and be installed into a proprietary chrome-plated Smeal decorative bezel that features an area for the installation of a discharge color-coding label.

The gauges shall display a range from 0 to 400 PSI with black markings on a white dial.

The test port manifold shall be from Innovative Controls and feature solid one-piece cast brass manifold construction located on the pump operator's panel. Removable chrome plated plugs shall be in two test ports, which shall protrude through the surface of the apparatus pump panel or subpanel for easy removal during manual pressure testing.

Plumbing ports 1-4 shall be behind the panel after installation. Each of these four ports (two on vacuum side and two on pressure side) shall have SAE brass fittings or plugs and be plumbed as needed into the vacuum and pressure lines and gauges.

Pressure ports 5 and 6 shall accept 1/4" NH fittings, plugs, or pressure transducers for real-time vacuum and/or pressure readings from one or both sides of the manifold. Port 5 shall be on the vacuum side and Port 6 shall be on the pressure side of the manifold. The location of these ports shall allow the manifold to totally drain if desired.

The test port manifold may be assembled to a decorative chrome-plated die-cast zinc bezel. This bezel shall reside on the outside of the panel after installation and hold a sub-surface printed polycarbonate overlay that will label each of the two exposed test ports – one shall be labeled ‘Vacuum’ or ‘VAC’ and the other ‘Pressure’ or ‘PRES’. This label shall cover the mounting screws and include a Spartan logo.

HARDWARE BRAND

The non-Storz discharge and intake fittings provided on this apparatus shall be South Park Corp. Brand, if available. We reserve the right to change the brand of adapters to an equivalent product due to supplier availability. 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 NH swivels, and the discharges shall terminate with male NH threads.

DISCHARGE, PRE-CONNECT, AND INTAKE DRAINS (SPARTAN)

An Innovative Controls 3/4" quarter turn drain, shall be included on each discharge, gated intake, and steamer valve (if applicable). A side stem, long stroke chrome plated lift handle shall be 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.

AUTOMATIC DRAINS

A Class 1 automatic drain shall be installed on the deluge valve (if applicable). The drains shall also be located in low laying areas (i.e., front discharge) The Drains will open whenever the pressure in the line drops below 6 PSI.

All poly lines leading to the pressure gauges, drains, etc. in relation to the water pump are to utilize compression fittings.

2" TANK FILL

A 2" tank fill shall be plumbed from the pump to the tank. Installation shall be completed with 2" 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 be actuated by a manual actuator installed on the valve. The manual actuator shall be controlled by a Spartan Style Innovative Controls push/pull T-handle.

The valve shall carry a ten (10) year warranty by the valve manufacturer.

3" TANK-TO-PUMP

A 3" tank-to-pump shall be plumbed with a flexible hose from the tank to the suction side of the pump. 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.

A check valve shall be 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 a manual actuator. The manual actuator shall be controlled by a Spartan Style Innovative Controls push/pull T-handle.

6" DRIVER SIDE MAIN INTAKE

A 6" main intake shall be 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 male NH threads.

One (1) 6" NH thread long handle chrome plated vented steamer cap shall be provided.

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

A 2-1/2" gated auxiliary intake with 2-1/2" plumbing shall be 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 TS manual actuator installed directly on the valve. The handle shall allow the valve to be controlled directly at the valve.

One (1) 2-1/2" NH thread rocker lug chrome plated vented plug, complete with cable or chain, shall be provided.

6" OFFICER SIDE MAIN INTAKE

A 6" main intake shall be 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 male NH threads.

One (1) 6" NH thread long handle chrome plated vented steamer cap shall be provided.

2-1/2" DRIVER'S SIDE DISCHARGE

A 2-1/2" discharge with 2-1/2" plumbing shall be located on the driver's side of the pump compartment. The discharge shall terminate with male NH thread.

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 a Spartan style Innovative Controls push/pull T- handle.

The discharge shall have a 2-1/2" (63mm) glass filled nylon 66 case TC series gauge with a Spartan bezel and a display range from 0 to 400 PSI. The gauge shall have a black dial graphic and pointer.

One (1) 2-1/2" female NH thread swivel rocker lug x 2-1/2" male NH thread 30 degree chrome plated elbow adapter shall be provided.

One (1) 2-1/2" NH thread rocker lug chrome plated vented cap, complete with cable or chain, shall be provided.

2-1/2" DRIVER'S SIDE DISCHARGE

A 2-1/2" discharge with 2-1/2" plumbing shall be located on the driver's side of the pump compartment. The discharge shall terminate with male NH thread.

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 a Spartan style Innovative Controls push/pull T- handle.

The discharge shall have a 2-1/2" (63mm) glass filled nylon 66 case TC series gauge with a Spartan bezel and a display range from 0 to 400 PSI. The gauge shall have a black dial graphic and pointer.

One (1) 2-1/2" female NH thread swivel rocker lug x 2-1/2" male NH thread 30 degree chrome plated elbow adapter shall be provided.

One (1) 2-1/2" NH thread rocker lug chrome plated vented cap, complete with cable or chain, shall be provided.

2-1/2" OFFICER'S SIDE DISCHARGE

A 2-1/2" discharge with 2-1/2" plumbing shall be located on the officer's side of the pump compartment. The discharge shall terminate with male NH thread.

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 a manual actuator installed on the valve. The manual actuator shall be controlled by a Spartan style Innovative Controls push/pull T- handle at the pump operator's panel.

The discharge shall have a 2-1/2" (63mm) glass filled nylon 66 case TC series gauge with a Spartan bezel and a display range from 0 to 400 PSI. The gauge shall have a black dial graphic and pointer.

One (1) 2-1/2" female NH thread swivel rocker lug x 2-1/2" male NH thread 30 degree chrome plated elbow adapter shall be provided.

One (1) 2-1/2" NH thread rocker lug chrome plated vented cap, complete with cable or chain, shall be provided.

4" OFFICER'S SIDE DISCHARGE

A 4" large diameter discharge, with 4" plumbing, shall be located on the officer's side of the pump compartment. The discharge shall terminate with male NH thread.

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 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 a manual actuator installed on the valve. The manual actuator shall be controlled by an Innovative Controls push/pull T- handle at the pump operator's panel.

The discharge shall have a 2-1/2" (63mm) glass filled nylon 66 case TC series gauge with a Spartan bezel and a display range from 0 to 400 PSI. The gauge shall have a black dial graphic and pointer.

One (1) 4" female NH thread swivel rocker lug x 4" male NH thread 30 degree chrome plated elbow adapter shall be provided.

One (1) 4" NH thread rocker lug chrome plated vented cap, complete with cable or chain, shall be provided.

2-1/2" FRONT BUMPER DISCHARGE

A 2-1/2" discharge shall be located above the gravel shield on the driver's side of the front bumper. The discharge shall be plumbed with 2-1/2" chassis installed stainless steel plumbing and OEM installed stainless steel plumbing and high-pressure flex hose with stainless steel couplings. The discharge shall terminate in male NH thread.

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

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 a manual actuator installed on the valve. The manual actuator shall be controlled by a Spartan Style Innovative Controls push/pull T-handle.

The discharge shall have a 2-1/2" (63mm) glass filled nylon 66 case TC series gauge with a Spartan bezel and a display range from 0 to 400 PSI. The gauge shall have a black dial graphic and pointer.

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

CROSSLAY CONFIGURATION

Two (2) 1-1/2" and one (1) 2-1/2" crosslay pre-connects shall be located above the pump panel. High-pressure flex hose with stainless steel couplings shall be used in the plumbing.

A 90 degree 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.

FLOORING

The floor of the pre-connect 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.

ROLLERS

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.

DIVIDERS

Two (2) dividers shall be in the crosslay area. Each divider shall be fabricated of 3/16"

aluminum with a handheld cutout and shall be mounted in a channel on each end for adjustability. The dividers shall have a maintenance free abraded finish.

TOP / END COVERS

The top and/or end covers shall be provided and installed by the dealer/Customer. The customer shall sign a statement of exceptions.

Two (2) On Scene, Access, crosslay hose bed lights shall be provided to illuminate of the crosslay hose bed area in accordance with NFPA, current edition. The lights shall be a 9" tube light with a chrome housing. The lighting circuit shall be activated when the parking brake is engaged.

1-1/2" PRE-CONNECT

A 1-1/2" pre-connect with 2" plumbing shall be provided. The pre-connect shall terminate out a swivel male NST threads.

The 1-1/2" crosslay pre-connect shall have a capacity of 250' of 1-3/4" double jacket fire hose stored in a single stack.

All hose load calculations are estimated using Snap-Tite standard hose.

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 a manual actuator installed on the valve. The manual actuator shall be controlled by a Spartan style Innovative Controls push/pull T- handle.

The discharge shall have a 2-1/2" (63mm) glass filled nylon 66 case TC series gauge with a Spartan bezel and a display range from 0 to 400 PSI. The gauge shall have a black dial graphic and pointer.

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

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A 1-1/2" pre-connect with 2" plumbing shall be provided. The pre-connect shall terminate out a swivel male NST threads.

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All hose load calculations are estimated using Snap-Tite standard hose.

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 a manual actuator installed on the valve. The manual actuator shall be controlled by a Spartan style Innovative Controls push/pull T- handle.

The discharge shall have a 2-1/2" (63mm) glass filled nylon 66 case TC series gauge with a Spartan bezel and a display range from 0 to 400 PSI. The gauge shall have a black dial graphic and pointer.

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

2-1/2" PRE-CONNECT

A 2-1/2" pre-connect with 2-1/2" plumbing shall be provided. The pre-connect shall terminate out a swivel NST.

The 2-1/2" crosslay pre-connect shall have a capacity of 250' of 2-1/2" double jacket fire hose stored in a single stack.

All hose load calculations are estimated using Snap-Tite standard hose.

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 a manual actuator installed on the valve. The manual actuator shall be controlled by a Spartan Style Innovative Controls push/pull T-handle.

The discharge shall have a 2-1/2" (63mm) glass filled nylon 66 case TC series gauge with a Spartan bezel and a display range from 0 to 400 PSI. The gauge shall have a black dial graphic and pointer.

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

AERIAL WATERWAY DISCHARGE

A discharge shall be 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 utilizes an electric controller with current limiting design.

The electric actuator shall be controlled by an Akron Brass electric 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. Two (2) additional buttons shall be available to be used for preset selection, preset activation and menu navigation. The controller shall have up to three (3) preset locations that can be user set and easily recalled upon each use. 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 provide position indication through a full-color backlit LCD display. 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. The display banner color and custom text shall be programmed to mirror the the signed order form (the color and verbiage may not be an exact match). The unit shall carry a five (5) year warranty.

The discharge shall have a 2-1/2" (63mm) glass filled nylon 66 case TC series gauge with a Spartan bezel and a display range from 0 to 400 PSI. The gauge shall have a black dial graphic and pointer.

WATERWAY FLOW METER

One (1) Class 1 Flowminder shall be installed to monitor the flow of the aerial waterway. The Flowminder shall have a LED display to indicate the volume of water being discharged. The display shall be weatherproof. The Flowminder shall be located at the pump panel.

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 protected by 275 degree Fahrenheit minimum high temperature flame retardant loom. All nodes and sealed Deutsch connectors shall be waterproof.

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 be rated for three feet submersion in water.
- Temperature range from -67° F to 257° F continuous at rated current.
- 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

Because of the harsh environment and susceptibility to moisture on the fire ground, the fire apparatus compartment doors shall utilize weatherproof switches. 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 degree to +185 degree Fahrenheit) 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, current edition. 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

A Whelen M6 series LED tail light assembly shall be installed on each side of the rear of the apparatus. Each assembly shall include the following:

- One (1) red LED stop/tail combination light with clease lens
- One (1) amber LED turn light with arrow with clear lens
- One (1) clear LED backup light

Each light shall be mounted in an individual black flange.

REAR WORK LIGHT SWITCH

A switch shall be installed above the tail light bezel on the left side of the rear of the apparatus. The switch shall be wired to the backup lights to provide additional work lighting. The rear work light circuit shall be deactivated when the park brake is disengaged. In addition to the lights being activated by the above switch, the lights shall also come on when the transmission is placed in reverse.

MIDSHIP TURN SIGNALS

Two (2) Tecniq model S170 amber LED midship auxiliary/turn signal lights shall be installed in the rub rail, one (1) on each side of the body.

The mid turn signals are to be set to steady burn and will only flash when activated.

PERIMETER GROUND LIGHTING

Tecniq, model T44-WD0B-1, 4" round LED lights shall be installed beneath the apparatus in areas where personnel may be expected to climb on and off 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 not be limited to, side running boards and the rear step area.

The lights activation shall match the chassis programming. The lights will be tied into the chassis ground light activation. All the body ground lights around the entire perimeter of the truck swill activate at the same time. Activation of the left and right side ground lights are not independent from each other.

CLEARANCE LIGHTS

Seven (7) Tecniq S170 red LED clearance lights with black bezels shall be installed in the tailboard portion of the rear. Two (2) lights in each of the driver's and officer's outboard corners and (3) centered at the rear.

Two (2) additional Tecniq lights shall be located as high and wide as possible on the rear of the apparatus.

On the sides of the apparatus there shall be two (2) lights located in each set of rear rub rails on the body. One (1) forward and one (1) rearward.

Clearance reflectors shall be placed on the apparatus to be in full compliance with applicable ICC and DOT codes and regulations.

Two (2) extension marker lights (rubber arm style) shall be installed at the rear portion of the body. The lights shall be attached to the back wall of the rear flex joint area. These lights shall aid the driver as to the location of the rear of the body during driving operations. The lights shall have forward facing amber bulbs and rearward-facing red bulbs.

CHASSIS SUPPLIED BACK UP CAMERA SYSTEM

A backup camera system shall be installed in the cab with the chassis. The camera shall be installed on the rear center upper portion of the apparatus.

DOOR OPEN AUDIBLE ALARM

An audible alarm shall be provided and connected to the door open circuitry.

UPPER ZONE A

The upper zone A warning lights shall be supplied and installed by the chassis manufacturer.

DIMMING FEATURE

The body warning lights to be wired into the chassis warning light dimming feature.

The side and rear warning lights shall be controlled through a chassis supplied virtual button on the vehicle display and control screen.

The warning light dimmer will automatically reduce the brightness of the warning lights with Multiplex display screen "Dim" or "Night" dimmer setting and with the park brake set.

Some lights do not have the dimming capability and will be omitted from the programming. This option is for Whelen 12v lighting only.

The dealer is responsible to ensure the proper chassis option(s) (Ref. 5422-020), to be compatible with this option are selected or they will be subject to a charge for the additional costs.

UPPER ZONE C

Two (2) Whelen M6 Series Linear Super-LED lights with black flanges shall be installed in Upper Zone C, on the upper rear face of the apparatus. The warning lights shall incorporate Linear Super-LED and Smart LED technology. The M6 configuration shall consist of eighteen (18) clear Super-LED’s and a clear optic polycarbonate lens. The

warning lights, with the aid of two screws, shall have the ability to be installed as a surface mount warning lights.

The M6 shall utilize optic collimators and a metalized reflector for maximum illumination. The warning lights shall include an internal flasher with 164 Scan-Lock flash patterns including a variety of CA Title 13 compliant patterns, left/right, top/bottom, in/out, and steady burn. The lights shall also provide synchronize and low power features. The M6 shall meet KKK 1822F, NFPA, current edition, SAE and EC65 specifications.

The lens/reflector assembly shall be sealed and resistant to water, moisture, dust, and other environmental conditions. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The light engine shall be installed at the rear of the unit and be vacuum tested to ensure proper sealing. The PC board shall be conformal coated for additional protection.

UPPER ZONE B/D SIDE WARNING LIGHTS

Four (4) Whelen ION -T Series red LED lights with clear lens and black housings shall be installed, two (2) each in Upper Zone B and Upper Zone D. The T-Series lights shall be capable of dimming should the dimming option be selected. The lights shall be compliant with NFPA KKK1822F requirements. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The conformal coated PC board and liquid injection molded lens/gasket assembly shall provide additional protection against environmental elements. The solid state warning lights shall be vibration resistant.

The light will have red LED's with clear lens and black bezel.

LOWER ZONE WARNING LIGHT PACKAGE

Four (4) Whelen T-Series Series Super-LED lights with black housing shall be installed in the lower zones B & D of the apparatus to be in accordance with NFPA, current edition compliance. The T-Series lights shall have the capability of dimming should the dimming option be selected.

Two (2) Whelen M6 Series Linear Super-LED lights with black flanges (or in the taillight cluster bezel) shall be installed in the lower zone C of the apparatus to be in accordance with NFPA, current edition compliance.

The lights shall have red LEDs and Clear Lenses.

INSTALL CHASSIS SUPPLIED TA

The chassis supplied traffic directional light and controller shall be installed by the OEM.

If you have selected the dimming feature, only Whelen traffic advisors with a TACTL5 control head will be programmed to be dimmable. All other traffic advisors will be omitted.

The traffic directional light shall be surface mounted on the rear of the body.

AIR HORN ACTIVATION

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

WHELEN 12 VOLT SURFACE MOUNT SCENE LIGHT

Two (2) Whelen, model PCPSM2, Pioneer Plus Super-LED lights shall be installed on the apparatus. The 154 watt +12v DC single panel Pioneer light head shall incorporate Super-LED combination flood/spot light installed in a black surface mount flange. The light configuration shall consist of 48 white Super-LEDs for the spot light with a specialized spot reflector on the bottom, 48 white Super-LEDs in the flood light with a clear optic collimator/metalized reflector assembly on the top, and a clear non-optic polycarbonate lens. Each PCPSM2 LEDs are instant on/off, eliminating high inrush current and ream-up time. Correlated color temperature simulates bright midday light. The Pioneer flood/spot lights shall have 16,000 usable lumens. Each light measure 16.22" wide by 6.38" high by 1.73" deep. The PCPSM2 combination optic design projects light directly down at 5° and producing illumination to the side of the vehicle arching upward to a 90° pattern of light.

The two (2) lights shall be installed on the side face of the body in the center, one (1) on each side.

The driver's side and officer's side scene light(s) shall be controlled by a switch located on the vehicle display in the chassis cab. One (1) rocker switch shall be located on the pump panel for each side of scene lights, for a total of two (2). The switch at the pump panel shall have an indicator that shall illuminate when the switch is in the “ON” position.

The activation for the driver's side scene lights on the vehicle display and the pump panel switch shall be labeled "LEFT SCENE" and the officer's side shall be labeled "RIGHT SCENE."

WHELEN 12 VOLT SURFACE MOUNT SCENE LIGHT

Two (2) Whelen, model PCPSM1B, Pioneer Plus Super-LED lights shall be installed on the apparatus. The 76 watt +12v DC single panel Pioneer light head shall incorporate Super-LED combination flood/spot light installed in a black surface mount flange. The light configuration shall consist of 12 white Super-LEDs for the spot light with a specialized spot reflector on the bottom, 24 white Super-LEDs in the flood light with a clear optic collimator/metalized reflector assembly on the top, and a clear non-optic polycarbonate lens. Each PCPSM1 LEDs are instant on/off, eliminating high inrush current and ream-up time. Correlated color temperature simulates bright midday light. The Pioneer flood/spot lights shall have 8,000 usable lumens. Each light measure 8.98" wide by 6.38" high by 1.73" deep. The PCPSM1 combination optic design projects light directly down at 5° and producing illumination to the side of the vehicle arching upward to a 90° pattern of light.

The two (2) lights shall be installed on the rear face of the body, one (1) on each side.

The rear scene light(s) shall be controlled by a switch located on the vehicle display in the chassis cab and one (1) switch located at the pump panel. The switch at the pump panel shall have an indicator that shall illuminate when the switch is in the “ON” position.

The activation on the vehicle display and the pump panel switch shall be labeled "REAR SCENE."

GENERATOR

A Harrison hydraulic driven generator shall be installed on the apparatus. The continuous duty rating of the generator shall be 6,000 watts, 25/50 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 unit to be started and shut down remotely. The generator shall be a commercial type with a heavy duty bearing and 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 ISO 46 fluid. 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

A Harrison generator meter display shall be provided with the generator. The display 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.

A remote start switch shall be 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.

8 CIRCUIT NON-GFI LOAD CENTER

A 120/240-volt load center shall be 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 accordance with NFPA, current edition. 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, current edition. as well as nationally accepted electrical codes.

BRANCH CIRCUIT OVERCURRENT PROTECTION

Over current protection devices shall be provided for circuits in accordance with NFPA, current edition. 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.

DRIP TRAY

One (1) drip tray shall be installed inside the upper section of the compartment containing the load center. The aluminum drip tray shall collect water that accumulates on the shutter and drips into the compartment when the door is rolled up. A drainage tube will allow the collected water to exit underneath the apparatus. The pan shall also serve to protect the shutter from damage due to impact from behind or below.

120V RECEPTACLE

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

The receptacle shall be located in the L1 compartment.
The exact location will be determined by the apparatus manufacturer, unless a specific location is clarified in the shop note.

120V RECEPTACLE

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

The receptacle shall be located in the R1 compartment.
The exact location will be determined by the apparatus manufacturer, unless a specific location is clarified in the shop note.

77 AERIAL LADDER CONSTRUCTION STANDARDS

The aerial ladder shall be of the rear mount design with the ladder extending toward the front of the apparatus when stowed. The aerial ladder shall be comprised of three sections and shall extend to a nominal height of 77 feet at 72 degrees, measured in a vertical plane from the top rung to the ground. To maintain a maximum level of safety, units exceeding a 76 degree angle of inclination, in accordance with NFPA, current edition, shall not be acceptable.

OPERATIONAL ENVELOPE/REACH

The aerial ladder shall have an operations range of negative 6 degrees elevation to positive 72 degrees elevation.

A minimum horizontal reach of 71' 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.

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 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.

All welding of structural components, including the aerial ladder sections, turntable, pedestal, and outriggers, will be in compliance with the American Welding Society standards. All welding personnel will be certified, as qualified under AWS welding codes. Materials used to manufacture the structural components are to be certified by the mill that manufactured the materials. Certifications or re-certifications of structural materials by vendors other than the mill they were manufactured at will not be acceptable. Any material testing that is performed after the mill test will be for verification only and not completed with the intent of changing the classification. Any welded structural component for the ladder will be traceable to their mill lots.

PRIMARY DIMENSIONS

The inside dimensions of the ladder shall be as follows:

- Base Section - 33.500"
- First Fly Section - 28.250"
- Last Fly Section - 22.500"

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

- Base Section - 22.375"
- First Fly Section - 19.375"
- Last Fly Section - 15.375"

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, in accordance with NFPA, current edition., and these specifications. Any apparatus claiming to exceed the testing requirements of NFPA, current edition shall provide certified documentation of the tests.

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 in accordance with NFPA, current edition. 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:

- With front stabilizers: The dead load of the aerial plus the rated capacity of 750 lbs. at the tip of the aerial; while flowing 1500 GPM, at a 90-degree angle to ladder centerline;

OR

- Without front stabilizers: The dead load of the aerial plus the rated capacity of 500 lbs. at the tip of the aerial; while flowing 1500 GPM, at a 90-degree angle to ladder centerline;

OR

- No Waterway: The dead load of the aerial plus the rated capacity of 500 lbs. at the tip of the aerial; while flowing 1000 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 (-6 to +72).

AERIAL DEVICE SAFETY FACTOR SERVICE LIFE

The purchaser desires to purchase 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. Any apparatus claiming to exceed the guidelines of NFPA, current edition shall provide certified documentation.

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 SERIAL NUMBER PLATE

A permanent label shall disclose the following information relative to the aerial device (See turntable console lid):

Model

Serial number

Shop Order Number

OTHER LABELS

Maximum hydraulic system pressure

Hydraulic oil type

All other appropriate labels to ensure safe operation of the aerial device shall be supplied in conspicuous locations.

THIRD PARTY NON-DESTRUCTIVE TESTING

Welds shall be tested using two (2) non-destructive methods by an independent third party. Devices that have not been certified by an engineer that is independent of the manufacturer shall not be acceptable. Welds shall be tested using two-(2) non-destructive methods by an independent third party inspection firm. Steel and aluminum ladders shall, at a minimum, 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 shall have 100% of all structural welds tested using dye penetrate method and visual method.

Manufacturers who rely only on visual inspection, performed in-house or by a third party, as a primary method of testing shall not be considered, and their bid shall be rejected.

STRUCTURAL SAFETY FACTOR

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, current edition. 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, current edition.

The following are specific descriptions of what tests are to be performed, and conditions they shall be performed under, and strictly adhered to by the aerial manufacture set forth in these specifications and the current edition of NFPA, current edition.

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, and not external obstructions at the manufacturer's test location. This means 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. Manufacturers using a third-party to manufacture the aerial device must provide certified documentation the unit was tested by the manufacturer of the aerial and the final OEM manufacturer. This requirement is specified in NFPA, current edition 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.

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 complies with these specifications. Specifically, the aerial device shall be placed on a 5-degree downward slope with the stabilizers deployed per manufacturer's 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, deeply serrated rubber sheathing. The rung cover shall be installed on a minimum of sixty percent (60%) of each ladder rung. 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. To ensure ease of maintenance if damaged, manufacturers using embossed metal in place of the rubber rung covers are not acceptable.

To prevent corrosion of the rungs by introducing air to the inside, under no circumstances will rung covers attached with screws or rivets be acceptable.

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 and painted to match the primary body color. If the body is a two-tone design, the travel support shall be painted to match the top body color. The travel support shall be designed to be easily removable to allow for ease of maintenance and repair if 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 front outrigger box assembly for added stability.

The ladder rest shall be illuminated for night time operation. The illumination light shall automatically activate 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. An interlock switch shall be installed at the cradle to prevent operation of the stabilizers once the aerial has been elevated from the nested position.

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 4" 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, 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.

The elevation cylinder upper and lower pivot pins shall be installed with a secondary tensioning system to secure the pins and prevent them from slipping out over time. The design shall not inhibit the pins from being removed for future servicing purposes.

EXTENSION/RETRACTION SYSTEM

A fully 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 2.5" internal diameter (bore) and a 1.25" 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, to 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 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. NO EXCEPTIONS.

MAINTENANCE FREE SHEAVE BEARINGS

The aerial sheave bearings shall be made with continuous wound PTFE and high-strength fibers encapsulated in a 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 acceptable.

AERIAL CABLES

To ensure a maximum level of safety the following standards shall be used on the extension and retraction cable system with no exception:

- Cables shall have a 5:1 safety factor based on ultimate strength under all safe operating conditions.
- The factor of safety shall remain above 2:1 during any extension or retraction system stall
- The minimum ratio of the diameter of cable to the diameter of sheave shall be 1:12

All cables shall be pre-stressed, proof-loaded, and certified by the cable manufacturer to minimize changes to the cable lengths and performance.

CERTIFIED CABLE SWAGED SHACKLES

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

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 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 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.

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 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 secure 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 energy chain flex cables. These cables are specially designed and custom fit for each aerial apparatus.

the energy chain is virtually wear-free and offers extremely quiet operation. The energy chain is very well suited to resist the harsh environmental conditions by being able to withstand extreme temperatures and is also UV resistant.

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 prohibit the adjustment screws from embedding themselves into the pads, which may cause the pad to crack and fail.

To prevent additional maintenance and pressure points from the limited surface area, roller systems in place of wear pads will not be considered acceptable.

ROTATION BEARING

A 44" diameter external tooth, swing circle bearing shall be used for the rotation system. The bearing shall provide 360 degrees 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 bearing shall be bolted to the turntable and to the base support structure with 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 torqued from the top side of the turntable without the bolt or nut being held under the turntable by a person. Units requiring removal of equipment to access the torque bolts shall be considered unacceptable.

This design shall prevent the bolt from "spinning" while torque is being applied to the fastener. Application of Loctite or a similar compound alone, without any other means provided to hold the fastener shall not be acceptable. Additionally, this design feature shall not incorporate drilling, bending, welding on, or in any way modifying the structural fastener, nut, or washers.

ROTATION GEAR REDUCTION BOX

A hydraulically driven planetary gearbox with a drive speed reducer shall be used to provide infinite and minute rotation control throughout the entire rotational travel. The rotation gear reduction box shall be installed on the top side of the turntable so that it is easily accessible, yet 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.

Due to the additional maintenance required to keep two (2) rotation motors functioning properly without binding, units requiring more than one (1) rotation motor are not considered acceptable.

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 manual rotation drive tool supplied with the apparatus.

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 eliminating safety hazards.

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.

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.

To ensure the maximum amount of safety, units allowing aerial rotation to the short-jacked side of the apparatus or systems which only include a visual and audio warning without automatically stopping rotation shall not be acceptable.

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 below a preset angle of elevation, unless the aerial is rotated into the bed-zone envelope. The bed-zone shall be approximately 2 degrees of rotation to the left and right side of the center of the aerial bed support. Once this bed-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 bed-zone envelope is attained.

COLLISION PROTECTION INTERLOCK

The apparatus shall be equipped 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 to 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 -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 pre-set 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 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 allows operation of the aerial device PTO shift only after the chassis spring brake has been applied 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.

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 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.

The hydraulic system shall be designed in such a way that all non-sealing moving components whose failure could result in motion of the aerial device shall have a minimum bursting strength of four times the maximum operating pressure to which the component is subjected. The hydraulic system shall have adequate cooling for continuous operation of not less than 2-1/2 hours.

HYDRAULIC PRESSURE GAUGE

A 2-1/2" Innovative Controls 5,000 PSI, pressure gauge model IC-3010339-21933E-OTP, shall be 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.

3 MICRON HIGH-PRESSURE FILTER

A 3-micron filter shall be installed in the output line of the hydraulic system, after the hydraulic pump.

The stabilizer hydraulic and diverter valves will be located behind the turntable access steps and will be accessible though a panel.

*Shop Note: ***Subject to Engineering Approval****

RESERVOIR ISOLATION KIT

Two (2) 1/4 turn ball valves shall be installed on the hydraulic reservoir to isolate it from the hydraulic system. This shall minimize hydraulic fluid loss when changing filter elements during routine maintenance.

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 aerial and stabilizers in the case of main hydraulic pump failure.

Two (2) control switches for this emergency pump shall be provided. One switch shall be installed at the turntable control console and the stabilizer control station. The switches shall be labeled EPU.

The switch at the stabilizer control station shall be a lighted momentary switch. The switch at the turntable control pedestal shall be a lighted switch on the switch pad.

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. All collector rings shall be enclosed and protected with desiccant plugs to protect against condensation and corrosion. Due to the possibility of paint contamination and dirt attraction, units requiring oil or silicone to protect the collector rings shall not be acceptable.

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

A liquid filled angle indicator shall be 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 remain 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 INDICATORS

Numerals shall be applied 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 the length of extension shall be placed adjacent to indicating bands.

MANUAL ROTATION DRIVE TOOL

As required by NFPA, current edition, 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" subframe shall be installed on the chassis frame rails, integral with the stabilizers. The torque box shall be constructed of steel plate. The steel plates shall have a minimum yield strength of 36,000 psi and ultimate tensile strength of 58,000 – 80,000 psi. The torque box subframe assembly shall be capable of withstanding all torsional and horizontal loads when the apparatus is supported by the stabilizers. The torque box shall be bolted in place to the chassis frame rails.

The aerial torque box shall be painted with High Solids polyurethane paint. The color shall be black.

To prevent unnecessary stress on the chassis, apparatus that use the chassis frame in place of a true torque box shall not be acceptable.

The torque Box will be adequately lit for night time operations.

REAR STABILIZERS

One (1) set of extendable stabilizers with a span of 18', measured from the outermost edge of the stabilizers on each side of the apparatus, shall be installed for stability at the rear of the torque box. In order to get the true stabilizer spread, apparatus using measurements other than from each outside edge of the stabilizers shall not be considered acceptable.

The stabilizers shall be of the double box design with jack cylinders that have a 4" 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 cylinder either in the stowed position or the working position, should a charged line be severed at any point within the hydraulic system.

The steel used to build the stabilizer system shall have a minimum yield strength of 36,000 psi and ultimate tensile strength of 58,000 – 80,000 psi.

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 from 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 possibly 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 chassis parking brake is released.

Each extending style stabilizer shall have a painted stabilizer cover. The paint will match the color of the body unless noted in the shop order. 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 22".The stabilizer pad shall be maintained at a stored height to meet the NFPA required angle of departure.

STABILIZER FINISH

The extending rear stabilizer beams, inner jack tubes, and stabilizer pads shall be shot blasted 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 is 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 exposure 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 black.

STABILIZER EXTENSION SYSTEM

Extension of the horizontal rear 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 4.00" x 6.00" x .25" 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.

STABILIZER ANGLE LEVEL GAUGES

One (1) manual angle level gauge shall be 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.

One (1) manual angle level gauge shall be located on the 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 visibility of the stabilizer being positioned. All stabilizer control functions shall be of the electric paddle joystick style. The make and model of the joysticks shall be P-Q controls, model M105. The controls shall be designed to allow 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.

A stabilizer deployment warning alarm, activated by 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 stainless steel 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 shall contain the aerial circuit breakers, interlock components and control circuit distribution terminals. The control station shall be accessible through a painted stainless steel 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. They shall include an Innovative Controls graphic overlay 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

One (1) Whelen M6 Series Super-LED flashing light shall be installed on each extending stabilizer cover panel, for a total of two (2). These lights shall be red in color with a clear lens and activated by the aerial master switch and emergency master switch.

The light bezels shall match the color of the lower zone light bezels.

STABILIZER ARM WARNING LIGHTS

Four (4) Whelen 5G Series Super-LED red flashing lights shall be 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

Two (2) Truck-Lite LED, clear flood lights shall be provided at each stabilizer location to illuminate the surrounding area. The lights shall be located under the stabilizer beams and 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, including when 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 94" side to side and 83" 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, 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 in order to prevent 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 an easier transition to the first rung of the aerial ladder.

To prevent unnecessary added weight to the apparatus, the turntable shall not be built entirely from solid materials.

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 to keep the pins in place. The design shall not inhibit the pins from being removed by a qualified mechanic.

TURNTABLE HANDRAILS

Three (3) handrails 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 turntable access ladders.

TURNTABLE RESTRAINTS

Two (2) FRC ManSaver Bars, without covers, shall be installed in the spaces between the handrails. They shall be permanently attached at one end.

TURNTABLE WORK LIGHTING

The turntable shall be lighted for nighttime operation with two (2) 9" On Scene, which shall be automatically activated by the aerial master switch (day or night). The work lights shall be positioned so the light is directed toward the decking. The lights shall have cast aluminum housings to keep light from glaring upward into the operator's eyes.

An additional Truck-Lite LED light shall be recess mounted in the front access door of the control stand.

Shop Note: On-Scene Access Light

AERIAL HOUR METER

An hour meter shall be 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.

Hour meters that are not connected to the aerial system engagement are not considered acceptable in order to capture true aerial operational hours.

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 LED light with mounting clips for nighttime 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 the 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 - No Exceptions. 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 activated.

The control console surface shall be fabricated from aluminum and shall include a 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.

The control stand box shall have tread plate and the lid shall be painted aluminum. A hinged door shall be provided on the front of the control console with a lift and turn latch. This door shall allow access to the inner components for inspection purposes. A recessed work light shall be provided in the access door. A hinged access door shall be provided on the outboard side of the control panel. The door shall be provided with a spring loaded, slotted head latch. The opening shall allow access to the electrical components for service purposes

All turntable controls shall override the controls at the tip.

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
Fast idle button
Panel light mounted in cover
Rung alignment light
Ladder light switches
Ladder overload warning horn
System pressure gauge
Loadminder
Emergency pump unit switch and light
Monitor function controls
Intercom with controls
Operators load chart

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 the ladder function and provide the 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 to prevent retraction of the aerial device when 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 pressing and holding a momentary switch at the turntable control console while the retraction control is operated.

AERIAL LOAD SENSING SYSTEM

A Loadminder shall be installed at the operator's pedestal indicating the load(s) on the aerial device. The display shall be in the form of a LED illuminated bar graph. The instrument shall be readable in day and night conditions. The display shall be a "real time" display, thereby giving immediate readings to the operator. Additionally, a color-coded bar shall be above and below the actual LED bar graph, to surround the actual reading given to the operator; thereby making the display easier and faster to read. The color coded bars shall progress from green to yellow, and finally to red. When the LED bar graph illuminates, representing a load on the aerial ladder, the operator need only glance at the display to determine the load applied to the aerial device - in relation to 100% rated aerial device capacity.

The readout given by the display shall be continuous relative to the NFPA compliant aerial device rated capacity as stated in these specifications, and shall include (but not be limited to) the following items:

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

The Loadminder shall be connected to a 100 dB. alarm at the operator's control station that shall sound when the ladder load is above the rated capacity. This alarm system shall also be connected to two (2) strobe lights on the end of the base section, one on each side, to provide further notice to the operator of an unsafe condition.

AERIAL LADDER LOAD CHART

A load chart shall be installed at the turntable control console of the aerial ladder. The load chart shall illustrate the full operating range of the ladder, with the waterway dry or flowing water.

AERIAL COMMUNICATION SYSTEM

A Fire Research Always Clear Talking (ACT) Intercom, model ICA910-112, two-way system shall be provided between the aerial tip and the turntable control console. The intercom kit shall include two control modules, one at the aerial tip that is hands-free and one at the turntable control console that has a push-to-talk button, two speakers, and cables. The interconnection between control modules shall require two wires. The control modules shall have a LED volume display and push-button volume control. The hands-free module shall constantly transmit to the other module unless the push-to-talk button is pressed.

The intercom shall be designed for exterior use. The control module shall be no more than 2 7/8" high by 5 1/8" wide by 1 7/8". The speaker shall be no more than 5 1/8" high by 5 1/8" wide by 1 1/2" deep. The power requirements for each control module with a speaker shall not exceed 1/2 amp at 12 VDC.

TRACKING LIGHTS

Two (2) Whelen MPPW lights shall be installed low ahead of the cradle, on the base section of the ladder, one (1) on each side. The light fixtures shall have a white die cast aluminum housing, powder coated white.

The LED work lights shall be rated to last 100,000 hours and produce over 3600 lumens with an amp draw of 4 amps. The light shall have a 90-degree x 20-degree wide flood pattern. The lights shall be controlled from the operator control station at the base of the ladder.

A bolt-on bracket to support the light shall be included.

The tracking lights shall be controlled by a toggle switch located on the turntable control console.

EGRESS

A shorter than standard length, 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 minimize the risk and cost of 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.

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 corner joints, increase strength, and provide a professional appearance.

AERIAL LADDER CREEPER CONTROLS

A remote ladder creeper control shall be provided 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 accordance with NFPA, current edition.

A momentary switch shall be installed at the lower turntable control console to activate the creeper control system. When in the "normal" position, the system shall be de-energized. When the switch 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.

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.

A kick plate shall be provided with each step.

When folded for storage, the steps shall not present significant obstruction to personnel on the apparatus.

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.

AERIAL WIRING

The DC wiring 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.

This will allow up to 30 amps of 12V lighting on the aerial.

WHELEN PIONEER PLUS TIP LIGHTS

Two (2) Whelen PCH1P1 Pioneer Plus Super-LED light on a pedestal mount shall be installed at the tip of the aerial.

The rectangular extruded light fixture with die cast end caps shall measure 10-13/16" wide by 9-3/4" high by 6-1/16" deep and have a white powder coat finish. The light fixture shall have a single panel of (2) horizontal clusters of LED lamps with a molded vacuum metalized reflector that draws 6 amps at 12 Vdc. The light shall be mounted with an aluminum adapter plate attached to the pole with an On-Off toggle switch, switch box and a locking swivel joint with a 3/4" diameter NPT threaded base to allow the light to be manually tilted up/down and locked in position by the operator. There shall be a removable handle standard on the lighthead. The light shall have the Whelen lifetime warranty.

The light shall be complete with one (1) Whelen pedestal mount.

The lights shall be located at the aerial tip, one (1) on the driver's side and one (1) on the officer's side.

The tip light(s) shall be controlled by a toggle switch located on the turntable control console.

WHELEN LED VERTEX LOCATOR LIGHT

One (1) Whelen Vertex LED locator light provided. The light shall be housed in a surface mount black flange. The Omni-directional light shall incorporate six blue Super-LEDs with a clear non-optic hard coated polycarbonate dome lens. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The conformal coated PC board and sealed lens assembly shall provide additional protection against environmental elements. The light shall be activated by the aerial master switch.

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

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 swivel 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.

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 system shall consist of a 4-1/2" outside diameter pipe in the base section, a 4" outside diameter pipe on the second section, and a 3-1/2" outside diameter pipe on 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 de-greasing as needed, followed by shot blasting 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 provide an aerial waterway that is of unequaled 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 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 secured 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 shall be connected to the tip of the ladder and when it is toward the back, the device travels 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.

A switch shall be located at the turntable control console for the positional waterway. The switch shall activate an electric actuator mechanism that will lock the monitor in the desired position. Two (2) separate indicator lights shall be located near the positioning switch to inform the aerial operator of the current position of the monitor. The individual lights shall be labeled "Rescue" and "Water Tower".

To ensure maximum safety for personnel, units that require a firefighter to climb to the end of the ladder and manually change the position of the waterway will not be considered acceptable.

WATERWAY RELIEF VALVE

A 3/4" safety relief valve shall be installed in the base section waterway. The relief valve shall be preset 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 1-1/2" drain valve shall be installed in the lower section of the aerial plumbing under the apparatus. The valve, when opened, shall drain the aerial waterway and lower plumbing.

AERIAL WATERWAY INLET

A 4" inlet, with 4" plumbing, shall be installed on the officer's side pump panel of the apparatus to be used for supplying the aerial waterway.

A 4” NST waterway weld bushing shall be provided.

One (1) 4" NH thread rocker lug chrome plated vented cap, complete with cable or chain, shall be provided.

TASK FORCE TIPS FLEX ELECTRIC MONITOR

There shall be one (1) Task Force Tips Flex, model YN-EP1A-L, electrically controlled monitor installed at the end of the aerial waterway. The monitor shall operate with 12-volt direct current.

The electrical components for the monitor shall be waterproof and utilize current limiting and absolute position feedback to protect the drive train at the ends of travel. A six-pin electrical connection for a TFT remote control nozzle shall be provided. Electrical enclosure systems shall have a rating of IP66/IP67 per IEC 65029. The monitor shall allow direct connection to J1939 CANbus systems. The monitor shall be compatible with optional wired and wireless control stations. Monitor shall allow programming, operation, and service procedures through a mobile app. The monitor shall be equipped with manual override knobs for use in the event of power failure. The motors and knobs control stainless steel worm gears for rotation and elevation adjustment.

The monitor shall have the following capabilities:

- Full horizontal rotation with travel stops at 90° left and right of center
- Vertical travel of 135° with stops at 90° above horizontal and 45° below horizontal
- Field changeable rotation stops, and elevation stops at 45° and 60° above and/or 15° below horizontal. Soft stops can be programmed in any position
- Flow capability of 2000 GPM (7600 l/min) with friction loss of no more than 5 PSI (0.3 bar)
- 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 unit shall have a unique serial number and be covered by a written five-year warranty.

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 CODE-RPF female inlet and 3-1/2" male NH outlet.

PRIMARY REMOTE MONITOR CONTROL STATION (TURNTABLE)

Task Force Tips model # YC-RP panel mount operator station for Flex series remote control monitors shall be installed. The operator station shall be designed for surface panel mounting from front of panel using 4 fasteners. The unit shall have a mini four direction toggle for horizontal rotation, and vertical elevation. A paddle toggle shall control nozzle stream pattern adjustment. Five programmable buttons can be used to control oscillate, park, water valve, and other accessories. The button labels can be changed to match the functions. Controls can be operated with a gloved hand. The unit shall be programmable from a mobile app. Communications shall conform to J1939 standards.

The unit shall be weatherproof and utilize weatherproof components such as liquid tight electrical connections. A Deutsch connector shall be provided for ease of service and installation. The unit shall have a unique serial number and shall be covered by a two-year warranty.

REMOTE MONITOR TOGGLE SWITCH CONTROL STATION

Task Force Tips model # YC-TS toggle switch operator station for Flex series remote control monitors shall be installed. The operator station shall be designed for surface mounting using 4 fasteners. The unit shall have a mini four direction toggle for horizontal rotation, and vertical elevation. A paddle toggle shall control nozzle stream pattern adjustment. Controls can be operated with a gloved hand. Unit shall be programmable from a mobile app. Communications shall conform to J1939 standards.

The module shall be weatherproof and utilize weatherproof components such as liquid tight electrical connections. A Deutsch connector shall be provided for ease of service and installation. The unit shall have a unique serial number and shall be covered by a two-year warranty.

MONITOR COLOR

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

NOZZLE

A Task Force Tips, model M-ERP1500-NN, Master Stream automatic electric nozzle with 3-1/2" NH thread swivel base shall be provided. The nozzle shall be capable of producing a stream at any volume from 300 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 "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.

MONITOR SWEEP

The outlet vertical rotation shall be from -45 degrees to 120 degrees above horizontal with adjustable stops. When the monitor is operated above the plane of the aerial, the tip load shall be reduced by 250 lbs. The adjustable horizontal rotation shall have preset stops at 90 degrees left of center and 90 degrees right of center.

MONITOR SAFETY INTERLOCK

The monitor shall be equipped with a monitor safety interlock (MSI) that shall prevent the

monitor or nozzle from coming into contact with the cab windshield and/or roof. The MSI shall automatically stop the operator from lowering the aerial into the cradle until the monitor has been fully raised to prevent damage. In addition, the blue bed zone indicator shall not illuminate until the ladder is aligned with the cradle and the monitor is in the fully raised position.

STOW FEATURE

The monitor shall be equipped with a stow feature. When activated, the stow feature shall return the monitor to a pre-programmed or nested position. The stow feature shall be activated by a covered momentary switch on the turntable control console. A light shall be provided on the control console to advise when the monitor is in the nested position.

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

A 2-1/2” discharge shall be located at the tip of the aerial ladder. The discharge shall have a Task Force Tips VUM 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 the 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 CODE-RPM threaded male outlet. Port C1 shall be located on the left side of the valve and have a left-hand elbow quarter turn ball valve with 2-1/2" NH male outlet installed, extended 4-3/4" from the main valve. C2 and C4 shall have blind plugs installed. C3 shall be located on the right side of the valve and 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 ladder rungs without inducing any glare, which would hinder safety. Each light shall be equipped with an integral guard to protect it from damage. The lights shall be positioned such that all light be directed inward toward the rungs of the aerial sections, maximizing safety for all personnel during night operations. The lights shall also aid the operator in locating aerial ladder section in conditions of reduced visibility.

Designs that use luminescent tape on the rungs shall not be permitted as they require previous exposure to sunlight and can wear off over time.

The rung lighting shall be controlled by a toggle switch located on the turntable control console.

AERIAL LADDER SIGNS

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

BASE SECTION MOUNTED STOKES BASKET STORAGE

A storage box shall be provided on the base section for a Stokes basket. The box shall be on the officer's side of the base section to be the least obtrusive when viewing the aerial tip from the turntable control console. The box shall be fabricated from smooth aluminum and be painted to match the ladder. The box shall be attached to the aerial section using stainless steel fasteners. A painted aluminum lid shall be provided on the box to secure Stokes basket.

The stokes basket box will have a prox switch wired into the door-ajar warning light circuit to notify when the lid is open.

STRETCHER

The stretcher shall be dealer/customer supplied.

BASE SECTION MOUNTED ROOF LADDER

One (1) roof ladder mounting bracket set shall be provided on the outside of the base section, on the driver's side, for a solid beam 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 Bedliner Coating. Stainless steel fasteners shall be employed where the ladder bracket is bolted to the aerial section or ladder sign panel.

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-DR, 14' aluminum roof ladder with roof hooks on each end shall be provided.

FLY SECTION MOUNTED PIKE POLE

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

BODY PAINT PREPARATION

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 shall be caulked.
- All bright metal fittings, if unavailable in stainless steel or polished aluminum, shall be heavily chrome plated. Iron fittings shall be copper underplated prior to chrome plating.

PAINT PROCESS

The paint process shall follow the strict standards as set forth by 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 primer to achieve a total thickness of 2-4 mills. In the second stage of the paint process, the body shall be painted with BTLV650 High Solids Polyurethane Base Coat. A minimum of two to three coats of paint shall be applied to achieve covering. In the final stage of the paint process, the body shall be painted with a Clear Top 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 cooldown 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.

The paint shall be a standard non-metallic - color.

BODY PAINT COLOR

The paint chip is the sole defining paint color; it overrules what is described in this spec.

The body shall be painted with High Solids Polyurethane Base Coat.

The single tone body shall be painted red.

PUMP MODULE STRUCTURE OVERLAYS

The side mount structure overlays shall be the same material as the pump panels on each side of the pump compartment. The tubular structure will remain unpainted aluminum.

AERIAL COMPONENT PROTECTION / PAINT

The paint chip is the sole defining paint color; it overrules what is described in this spec.

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 primed and finish painted with a 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 shot blasted to remove any mill scale, or contamination prior to galvanizing.

Following this preparation, the individual components shall be hot dip galvanized. The galvanizing process requires 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-based self-etching coating. No exceptions shall be allowed to this requirement.

The high gloss polyurethane paint, which shall be 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 Fahrenheit. 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 High Solids polyurethane enamel paint. The color shall be white.

The paint shall be a standard non-metallic - color.

AERIAL CORROSION PROTECTION

Internal structural members of the aerial structure shall be 100% concealed from oxygen or have corrosion protection applied. Totally sealed members are not subject to the possibility of corrosion attacking the metal from the interior.

The 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 on the inside of the tube. No exceptions as this is imperative to the strength and integrity of the aerial structure.

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-repellent, flexible, air-dried film has crevice penetrating, spreading and clinging characteristics. 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 High Solids polyurethane enamel paint. The color shall be red.

AERIAL LADDER SIGN PAINT COLOR

The aerial ladder signs, mounted on the base section, shall be painted the same color as the body.

UNDERCOATING

The apparatus shall undergo a two-step undercoating process. The first step shall be a rubberized polyurethane base compound 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 are not 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 hinder normal maintenance.

CORROSION PREVENTION

One (1) 3.75 ounce tube of Electrolysis Corrosion Kontrol (ECK) shall be provided to use when 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 an anti-seizing lubricant for threads. ECK is dielectric and perfect for use with electrical connectors.

THERMOPLASTIC COATING

In designated areas, Bedliner Coating XS-350, a two-component spray-in-place thermoplastic polyurethane system shall be used for maximum protection of the body and equipment. Bedliner Coating 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 adhere 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)

SAMPLE PAINT CARD

One (1) sample paint card shall be provided with the apparatus. The card shall show an example of the apparatus body color on one side and have the specific paint formula printed on the reverse side.

All lettering and graphics will be dealer/customer supplied and installed.

REFLECTIVE STRIPING - STABILIZER BEAMS

Retroreflective striping, utilizing a chevron pattern, shall be installed on the front and rear sides of the two (2) horizontally extending stabilizer beams for increased visibility when extended. The striping shall be 4" wide and white in color.

CHEVRON COLOR - RED/FLUORESCENT YELLOW-GREEN

The chevron striping shall consist of red, 3M part number 1172 EC, and fluorescent yellow-green, 3M part number 4083, and shall meet the chevron color requirements in accordance with NFPA, current edition.

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 sheeting's that use glass bead lenses. It is intended to also provide high sign brightness in the legibility distance where other sheeting's do not. If something other than 3M is being used, third party documentation must be provided with the bid to prove it is compliant with Federal DOT and NFPA, current edition.

CHEVRON STRIPING - REAR BODY

Retroreflective striping shall cover at least 50% of the rear-facing vertical surfaces in accordance with NFPA, current edition. The striping shall be in a chevron pattern sloping downward and away front the centerline of the apparatus at an angle of 45 degrees. Each stripe shall be a minimum of 6" in width. 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.

The chevron pattern shall include the rear face of the body. The torque box door shall be excluded from the chevron reflective striping.

GENERAL TWO (2) YEARS or 36,000 MILES LIMITED WARRANTY

Purchaser shall receive a General Two (2) Years or 36,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0002. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

BODY STRUCTURE (ALUMINUM) TEN (10) YEARS or 100,000 MILES LIMITED WARRANTY

Purchaser shall receive a Body Structure (Aluminum) Ten (10) Years or 100,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0502. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

AERIAL LADDER STRUCTURE TWENTY (20) YEARS or 100,000 MILES LIMITED WARRANTY

Purchaser shall receive a Aerial Ladder Structure Twenty (20) Years or 100,000 Miles

limited warranty in accordance with, and subject to, warranty certificate RFW0403. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

AERIAL LEAK-FREE HYDRAULICS THREE (3) YEARS or 48,000 MILES LIMITED WARRANTY

Purchaser shall receive a Aerial Leak-Free Hydraulics Three (3) Years or 48,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0421. The warranty certificate is incorporated by reference into this proposal and included with this proposal or available upon request.

AERIAL WATERWAY TEN (10) YEARS or 100,000 MILES LIMITED WARRANTY

Purchaser shall receive a Aerial Waterway Ten (10) Years or 100,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0810. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

ELECTRICAL TWO (2) YEARS or 36,000 MILES LIMITED WARRANTY

Purchaser shall receive a Control-MAXX™ Electronics Two (2) Years or 36,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0232. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

PLUMBING AND PIPING (STAINLESS STEEL) TEN (10) YEARS or 100,000 YEARS LIMITED WARRANTY

Purchaser shall receive a Plumbing and Piping (Stainless Steel) Ten (10) Years or 100,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0800. The warranty certificate is incorporated by reference into this proposal and included with this proposal or available upon request.

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. Full details shall be provided in the complete warranty document.

PAINT AND FINISH (EXTERIOR CLEAR COATED) TEN (10) YEARS LIMITED WARRANTY

Purchaser shall receive a Paint and Finish (Exterior Clear coated) Ten (10) Years limited warranty in accordance with, and subject to, warranty certificate RFW0710. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

PUMP WARRANTY

The fire pump shall be warranted by Waterous for a period of seven (7) years from the date of delivery to the fire department or seven and one-half (7-1/2) years from the shipment date by Waterous, whichever period expires first. Full details shall be provided in the complete warranty document.