Shop Note: CO A, B, C, E, F incorporated , Chassis CO D

Smeal 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, V-Mux specifications (including Node Input/output Spreadsheet and Node Relationship Spreadsheet), and Master Wire Listing. A contact letter shall also be provided by the electrical engineer, who built the manual, with instructions on using the manual and contact information for assistance with electrical manual questions.

ELECTRICAL SCHEMATICS

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 PLATFORM DEVICE DEMONSTRATION - (4) DAYS

A factory trained and authorized instructor shall provide four (4) 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.

PRE-CONSTRUCTION MEETING

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

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

- Complete specifications of the apparatus including the chassis
- Detailed amp draw report
- Listing of clarifications or questions from the manufacturer that require attention (shelf locations, lettering details, etc.)
- A pre-construction drawing shall be provided that encompasses all views on a single page

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

FINAL INSPECTION

The 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.

The water tank shall be filled to capacity for the final inspection to allow the department to operate the pump.

MAXIMUM OVERALL HEIGHT

The overall height of the apparatus shall not exceed 130" (10'-10") 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 573" (47'-9").

WHEELBASE

The wheelbase of the apparatus shall not exceed 244".

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 GLADIATOR CHASSIS

The chassis shall be a Spartan Gladiator.

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.

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

RELOCATE CAB TILT

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

Shop Note: Install on the front wall of PR1

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

MAP CONSOLE

A map console shall be installed in the chassis cab. The console shall be 9-1/8" wide x 13" long and 10" deep. The console shall hold three (3) binders up to 2-1/2" thick. The map console shall be constructed of aluminum and shall have an interior abraded finish and an exterior gray Bedliner Coating finish.

The map console shall be mounted on the engine tunnel. The map console shall be mounted upright, utilizing a "drop-in" style so the maps are accessible from the top.

Shop Note: The map box is to be shipped loose with the truck

A hazard warning circuit shall be tied to the circuit for the "open door" warning light in the chassis in addition to the Vista display to alert the driver of an unsafe condition for moving the apparatus. The Vista 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."

ALUMINUM MOUNTING PLATE ON ENGINE TUNNEL

A 3/16"Â aluminum mounting plate shall be on the top of the chassis engine tunnel for the mounting of equipment. The plate shall be mounted on 3/4" spacers and will be on the flat portion of the engine tunnel only. The mounting plate shall have a gray MultiSpec MS90 finish.

ENGINE TUNNEL TREAD PLATE SHELF

One (1) aluminum tread plate shelf shall be installed on the rear of the engine tunnel. The shelf shall have a mounting surface of approximately 6".

PAC TRAC MOUNTING PLATES ON BACK WALL OF CAB

PAC TRAC tool mounting sections shall be installed on each outboard portion of the back wall of the chassis cab.

120V RECEPTACLE

One (1) NEMA 5-15R, 120-volt, duplex, 3-wire, straight blade (household type), receptacle shall be installed on the apparatus. The receptacle shall have a 15-amp rating and shall include a spring loaded weather resistant cover if mounted in an exterior location. The receptacle shall be wired to the shoreline power supply.

The outlet shall be located inside the chassis cab, behind the officer's seat.
The exact location will be determined by the apparatus manufacturer, unless a specific location is clarified in the shop note.

WATER TANK

The apparatus shall be equipped with a United Plastic Fabricating (UPF) 300 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 carrier shall be designed specifically for this apparatus. The carrier structure shall be supported by and welded directly to the top plate of the torque-box.

WATER TANK DRAIN

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.

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 4" x 12" 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) Innovative Controls SL Plus Tank Level Monitor System shall be provided on the pump operator's control panel. The system shall include one (1) electronic display module, a stainless steel pressure transducer sending unit, and wiring with water-tight plug terminations not requiring sealing grease.

The master display module shall show the tank level using 16 super-bright easy-to-see LEDs. Tank level indication shall be achieved by the appropriate illumination of 4 horizontal rows of LEDs, with 4 LEDs per row. Full and near-full levels shall be indicated by the illumination of all 4 rows of LEDs, tank levels between 1/2 and 3/4 full shall be indicated by the illumination of the bottom 3 rows of LEDs, tank levels between 1/4 and 1/2 full shall be indicated by the illumination of the bottom 2 rows of LEDs, and tank levels between 1/4 full and near empty shall be indicated by the illumination of the bottom row of 4 red LEDs only. Tank levels between near empty and empty shall be indicated by flashing the bottom row of 4 red LEDs.

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

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.

HOSE BED

The hose bed shall be located at the center rear of the truck, behind the water tank. The inside of the hose bed shall be constructed of smooth aluminum. Hose shall be accessible from a narrowing of the hosebed at the rear, and the opening shall be free of obstructions that might interfere with the deployment and loading of hose. 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 baked on.

The hose bed shall contain the following hose load:

500' of 5" double jacket hose

There will not be a hosebed cover installed on the hosebed. A statement of exceptions will need to be signed.

Shop Note: SOE to be signed

One (1) webbing restraint shall be located on the rear of the hosebed. The webbing shall be a one-piece design. The bottom shall be secured with footman loops. The upper will be secured with Stayrite bungee attachments at each upper corner.

HOSE BED LOADING LIGHTS

Two (2) On Scene, Night Axe, hose bed loading lights shall be provided to illuminate of the hose bed area in accordance with NFPA, current edition. The lights shall be a 9" tube light with a chrome housing. 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.

Shop Note: The lights will be placed on the front wall of the hosebed.

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 shall consist 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. 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. Each roll-up door shall have a satin finish.

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.

Shop Note: Compartment L4 is a vertically hinged lap type door.

SIDE COMPARTMENT DOOR (L4)

A Hinged lap-type compartment door shall be installed on driver's side rear body compartment. The lap door shall be a double panel construction with the outer panel fabricated of .190" 3003-H14 aluminum and the inner panel of .125" 3003-H14 aluminum. Rubber molding shall be installed in the overlap area of the door to insure a weatherproof seal and prevent water from collecting in the door sills. Weep holes shall be installed at the bottom of the doors to drain moisture from between the door panels. 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 vertically hinged door shall be supplied with one (1) Cleveland-style spring loaded door holder on the compartment door to hold the door in either the fully open or partially closed position. Each gas spring door holder shall close the door automatically when it is positioned past center or return the door to the fully open position if the center point is not reached and the door is released.

The inner lap type door panels 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.

DOOR HANDLES

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

DRIP TRAYS

Drip trays with drains shall be provided in the upper section of all body compartments with roll-up doors. Each drip tray shall prevent moisture from the roll-up door spool from entering the compartment interior.

REAR COMPARTMENT DOOR

A double vertically hinged, single panel compartment door shall be installed on the compartment face to insure a weatherproof seal and prevent water from collecting in the door sill. The compartment door shall have a polished stainless steel continuous hinge with a rubber seal installed between the hinge and the aluminum door to separate the dissimilar metals. The hinge pin shall be stainless steel with a minimum diameter of 1/4".

The compartment doors shall be positively latched using compression latches.

There shall be two (2) pressurized gas-filled cylinders furnished, one on each compartment door. The cylinders shall hold the doors in the open position and assist in opening them. The gas filled cylinders shall assist in closing the doors automatically when the doors are positioned over center.

The compartment shall be adequately lit for nighttime operations.

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 eighteen (18) 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.

Shop Note: Two lights to be installed in L1, L2, L3, R1, R2, R3, R4, PR1. One light will be installed in L4. One light will be installed in T1 (horizontally)

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.

TURTLE TILES

Black Turtle Tile Plastics interlocking squares shall be in all body compartments. The Turtle Tiles shall be applied in all body compartment shelves, adjustable-height trays, floor-mounted trays, and on compartment floors that do not contain floor-mounted trays. No Turtle Tiles shall be applied on compartment floors

underneath floor-mounted trays. For maximum slip resistance and drainage each square shall have a grid surface design

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

An anodized aluminum angle sill protector shall be installed on the bottom sill area of the compartment with lap style doors to aid in reducing paint damage from equipment. The sill protectors 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 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 L1 within these specifications and any ensuing paperwork or drawings after contract execution.

The dimensions of the compartment shall be:
- Height: 17"
- Width: 55"
- Depth: 14" Upper and 14" Lower
- Intermediate Divide Height: "

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: 17"
- Width: 55"
- Depth: 14" Upper and 14" Lower
- Intermediate Divide Height: "

COMPARTMENT L3
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 L3 within these specifications and any ensuing paperwork or drawings after contract execution.

The dimensions of the compartment shall be:
- Height: 49"
- Width: 51"
- Depth: 26" Upper and 26" Lower
- Intermediate Divide Height: 37"

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: 35"
- Width: 10"
- Depth: 9" Upper and 9" Lower
- Intermediate Divide Height: "

L1 Components

MOUNTING SURFACE

One (1) PAC TRAC tool mounting section shall be installed on the back wall of the compartment. The PAC TRAC section shall be constructed of 7/8" thick 6063-T5 extruded aluminum.

Shop Note: The load center is located on the back wall. The PAC Track will run up next to the load center. The load center is too large to be mounted on the front wall.

L2 Components

TOOL BOARD

One (1) split swing-out aluminum tool board shall be located in the standard height compartment. The tool board shall be constructed of 3/16" aluminum. The tool board shall be mounted to horizontal struts to allow each side of the tool board to be relocated for depth in the compartment. There shall be an adjustable positive latching mechanism mounted to the ceiling and the floor of the compartment that shall secure each side of the tool board in the close position. The tool boards shall utilize friction washers to hold them in both the opened and closed position.

The tool board shall have a maintenance-free abraded finish and be of a pegboard pattern design.

MOUNTING SURFACE

One (1) PAC TRAC tool mounting section shall be installed on the back wall of the compartment. The PAC TRAC section shall be constructed of 7/8" thick 6063-T5 extruded aluminum.

L3 Components

ADJUSTABLE SHELF

One (1) aluminum adjustable full-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.

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.

L4 Components

DRIVER'S SIDE REAR WHEEL WELL POSITION - WL1

A wheel chock compartment shall be installed in the forward portion of the rear wheel well area, on the driver's side. The compartment shall be capable of storing two wheel chocks.

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 - WL2

Back to back single extinguisher/water can compartments shall be installed in the rear wheel well area, between the tandem axles. The compartments shall be large enough to hold an extinguisher/water can up to 9" in diameter, with sufficient space for the discharge tube. The compartments doors, flanges, 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 sheet aluminum construction 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 three (3) air bottle compartment shall be installed in the rearward 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.

OFFICER'S (RIGHT) SIDE BODY COMPARTMENTS

COMPARTMENT PR1
A full height compartment shall be located ahead of the rear wheels on the officer's side of the forward body module. This compartment shall be designated as PR1 within these specifications and any ensuing paperwork or drawings after contract execution.

The dimensions of the compartment shall be:
- Height: 32"
- Width: 23"
- Depth: 18" Upper and 18" Lower
- Intermediate Divide Height: "

COMPARTMENT R1
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 R1 within these specifications and any ensuing paperwork or drawings after contract execution.

The dimensions of the compartment shall be:
- Height: 17"
- Width: 55"
- Depth: 14" Upper and 14" Lower
- Intermediate Divide Height: "

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: 17"
- Width: 55"
- Depth: 14" Upper and 14" Lower
- Intermediate Divide Height: 0"

COMPARTMENT R3
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 R3 within these specifications and any ensuing paperwork or drawings after contract execution.

The dimensions of the compartment shall be:
- Height: 49"
- Width: 51"
- Depth: 26" Upper and 26" Lower
- Intermediate Divide Height: 37"

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: 32"
- Width: 31"
- Depth: 10" Upper and 22" Lower
- Intermediate Divide Height: 31"

PR1 Components

ADJUSTABLE SHELF

One (1) aluminum adjustable full-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.

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.

R1 Components

MOUNTING SURFACE

One (1) PAC TRAC tool mounting section shall be installed on the back wall of the compartment. The PAC TRAC section shall be constructed of 7/8" thick 6063-T5 extruded aluminum.

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.

R2 Components

MOUNTING SURFACE

One (1) PAC TRAC tool mounting section shall be installed on the back wall of the compartment. The PAC TRAC section shall be constructed of 7/8" thick 6063-T5 extruded aluminum.

R3 Components

ADJUSTABLE SHELF

One (1) aluminum adjustable full-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.

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.

R4 Components

ADJUSTABLE SHELF

One (1) aluminum adjustable full-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.

Shop Note: This shelf will only adjust down to the top of the outrigger control box

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.

OFFICER'S SIDE REAR WHEEL WELL POSITION - WR1

A wheel chock compartment shall be installed in the forward portion of the rear wheel well area, on the officer's side. The compartment shall be capable of storing two wheel chock.

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 - WR2

Two (2) single air bottle compartments shall be installed in the rear wheel well area, between the tandem axles. Each compartment door, flange, and hinges shall be constructed of stainless steel material. The doors

shall have a rubber gasket to create a 100% seal to protect the interior of the compartment. The storage compartments shall be a molded component that is assembled to the doors and flanges. The doors shall be painted primary body color.

OFFICER'S SIDE REAR WHEEL WELL POSITION - WR3

A three (3) air bottle compartment shall be installed in the rearward 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.

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 each body section as well as 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.

Modifications

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. Sufficient clearance shall be provided

in the wheel well to allow the use of tire chains when the apparatus is fully loaded.

STAINLESS STEEL FENDERETTES

Four (4) stainless steel fenderettes shall be installed at the outboard edge of the rear wheel well area, two (2) on each side. The fenderettes shall be bolted to the apparatus body using nylon washers to space them slightly away from the body to reduce 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.

ADDITIONAL HARDWARE

A bag of stainless steel nuts, bolts, and washers shall be supplied with the apparatus for mounting of equipment.

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 - DRIVER'S SIDE

For access to the turntable, a turntable access ladder shall be furnished on the driver's side of the apparatus near the front area of the turntable. The ladder assembly shall be a pull-out-and-down design with a slight angle to allow for better access to the turntable. The ladder shall lock in the stored position with a "T" handle type locking device. The top step of the access ladder shall be a fold down tread plate platform to allow for an easy transition from the ladder rungs to the turntable. When the ladder is in the down position the maximum height from the ground to the first step shall not exceed 24".

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

TURNTABLE ACCESS LADDER - OFFICER'S SIDE

For access to the turntable, a turntable access ladder shall be furnished on the officer's side of the apparatus near the front area of the turntable. The ladder assembly shall be a pull-out-and-down design with a slight angle to allow for better access to the turntable. The ladder shall lock in the stored position with a "T" handle type locking device. The top step of the access ladder shall be a fold down tread plate platform to allow for an easy transition from the ladder rungs to the turntable. When the ladder is in the down position the maximum height from the ground to the first step shall not exceed 24".

The access ladder shall be connected to the door open warning circuit to warn the driver if it is not in the stored position. The steps shall be illuminated for night time operation with Grote LED lighting. The lights shall be activated by the parking brake. To aid in ascending and descending the access steps, knurled aluminum handrails shall be provided on each side of the steps. The handrails shall utilize white colored LED backlighting with red reflective. The lower bracket on the vertical handrails shall have a drain hole drilled in it at the lowest point.

PLATFORM ACCESS STEPS - DRIVER'S SIDE

For access to the platform, one set of steps shall be furnished on the driver's side of the apparatus at the rearward portion of the body. The steps shall be constructed of aluminum grip-strut.

The bottom step shall be a swing-down type that shall allow ease of access to the top of the body, which shall allow easy access to the platform. The step surface shall be constructed of grip-strut material. This step shall be connected to the door open warning circuit to warn the driver if left down.

The remaining steps shall have a maximum stepping height, which shall not exceed 18", with the exception of the ground to the first step. Steps shall be illuminated for nighttime operation with Grote LED lighting, actuated by the parking brake. To aid in ascending and descending the access steps, knurled aluminum handrails shall be provided on each side of the steps and one (1) on the body above the steps. The handrails shall utilize

white colored LED backlighting with red reflective. The lower bracket on the vertical handrails shall have a drain hole drilled in it at the lowest point.

FRONT TREAD PLATE OVERLAYS

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

Shop Note: Also include the rear face of the oil tank compartment and PR1

BACKLIT HANDRAILS

All handrails, unless otherwise stated, shall be constructed of knurled aluminum with white colored LED backlighting and (2) recessed "Reflexite" reflective strips, red in color. All railing shields and brackets shall be chrome plated and shall be bolted to the body with stainless steel bolts. The lower bracket on all vertical handrails shall have a drain hole drilled in it at the lowest point.

The following handrails shall be provided on the apparatus:

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 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) Duo-Safety, model 701, 14' "Fresno" attic extension ladder with a 13" rail width shall be provided.

One (1) Duo-Safety, model 875-A, 16' aluminum roof ladder with folding roof hooks shall be provided.

One (1) Duo-Safety, model 875-A, 20' aluminum roof ladder with folding roof hooks shall be provided.

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

One (1) Duo-Safety, model 1200-A, 35' aluminum two-section extension ladder shall be provided.

LITTLE GIANT LADDER STORAGE

Brackets shall be located above the chassis cab roof to provide storage for the Little Giant ladder. The Little Giant ladder shall be secured in place with a tread plate end cap on the forward end and adjustable straps on the rear end.

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

PIKE POLE STORAGE

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

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

Two (2) Fire Hooks Unlimited, model RH-6, 6' steel shaft pike poles with a New York Roof Hook and chisel end shall be provided.

Two (2) Fire Hooks Unlimited, model RH-8, 8' steel shaft pike poles with a New York Roof Hook and chisel end shall be provided.

Two (2) Fire Hooks Unlimited, model NHF-12, 12' fiberglass (ash core) pike poles with a National Hook and butt-style end shall be provided.

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

Two (2) Fire Hooks Unlimited, model NHF-4 w/D, 4' fiberglass (ash core) pike poles with a National Hook and an aluminum "D" style handle shall be provided.

DRIVER'S SIDE FORWARD WHEEL WELL POSITION - WL1

A wheel chocks compartment shall be installed in the forward portion of the rear wheel well area on the driver's side. The compartment shall be capable of storing one pair of wheel chocks.

WHEEL CHOCKS

One (1) pair of Zico, model SAC-44, wheel chocks shall be provided with the apparatus.

OFFICER'S SIDE FORWARD WHEEL WELL POSITION - WR1

A wheel chocks compartment shall be installed in the forward portion of the rear wheel well area on the officer's side. The compartment shall be capable of storing one pair of wheel chocks.

WHEEL CHOCKS

One (1) pair of Zico, model SAC-44, wheel chocks shall be provided with the apparatus.

INDEPENDENT ALUMINUM PUMP MODULE

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

PUMP COMPARTMENT LIGHTS

Two (2) 9" On-Scene Night Axe 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.

DRIVER'S SIDE RUNNING BOARD

An integral running board shall be installed on the driver's side of the pump module. The running board shall be constructed of aluminum and overlaid with anti-slip tread plate. The outside edge of the running board shall be covered by a rub rail and shall be flush with the rub rail that is installed on the body to maintain a uniform appearance.

OFFICER'S SIDE RUNNING BOARD

An integral running board shall be installed on the officer's side of the pump module. The running board shall be constructed of aluminum and overlaid with anti-slip tread plate. The outside edge of the running board shall be covered by a rub rail and shall be flush with the rub rail that is installed on the body to maintain a uniform appearance.

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.

TOP PUMP ACCESS PANELS

A tread plate access panel, split in the center, shall be provided on the top of the pump compartment. The panel shall be of the single pan design and shall be positively latched in the closed position utilizing (8) compression latches. The panel shall be split in the center allowing access from either side of the pump compartment. This area is above the pump compartment, behind the turntable, allowing service of the pump and components.

CONTROL PANEL

The driver's side of the pump enclosure shall be divided into two sections. The lower section shall be where all

valve controls, the primer control, the discharge relief valve controls (pilot valve), and other mechanical controls are located. This surface shall be referred to as the "control panel".

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

INSTRUMENT PANEL

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

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

OFFICER'S SIDE PUMP PANEL

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

PANEL SURFACES

The control panel, instrument panel, and officer's side pump panel shall be coated with black 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

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

VERBIAGE TAG BEZEL ASSEMBLIES

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

SAFETY MESSAGE BEZEL ASSEMBLIES

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

PUMP PANEL LIGHTING

The pump operator's control panel and the officer's side pump panel shall each be illuminated by On-Scene LED Night Axe lighting. The pump panel lights shall become energized upon setting the 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.

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

MIDSHIP MOUNT FIRE PUMP

The pump shall be a Waterous 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 2000 gallons per minute.

FIRE PUMP MOUNTING

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

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

The pump module shall be mounted to the frame in 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 Pump Boss Max pressure governor and control module kit shall be installed. The system 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 7-1/2" high by 3-5/8" wide. 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 2" from the front of the control module. The control LCD shall be 3.5" in size with a minimum brightness of 1000 nits and optically bonded to 3mm Borofloat Glass. Inputs for monitored engine information shall be a J1939 data bus or independent sensors. Outputs for engine control shall be on the J1939 data bus or engine specific signal wiring. Inputs to the control module from the pump discharge and intake pressure sensors shall be electrical.

The following continuous displays shall be provided:

- Engine RPM; shown on LCD screen
- Check engine and stop engine warning; shown on LCD screen
- Engine Oil pressure; shown on LCD screen
- Engine coolant temperature; shown on LCD screen
- Transmission Temperature; shown on LCD screen
- Battery voltage; shown on LCD screen
- Pressure and RPM operating mode LEDs
- Pressure / RPM setting; shown on LCD screen
- Throttle ready / Ok to Pump LEDs

The screen (LCD) 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. LCD Screen and LED's intensity shall be automatically adjusted for day and night time operation.

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

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

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

The governor shall operate in two control modes, pressure and RPM. No discharge pressure or engine RPM variation shall occur when switching between modes. A throttle ready and Ok to Pump 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 low water and no water conditions with an automatic programmed response and a push button to return the engine to idle.

The pressure governor control module shall be programmed at installation for a specific engine.

The 6" intake valves have intake relief valves on them. If one of the valves is removed the main pump intake relief valve will need to be installed.

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

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 140º 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 acts as an additional protection device 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 AND ENGINE COOLING SYSTEM

A pump and engine cooling system shall be provided on the apparatus. The cooling system shall keep the engine cool when running for long periods of time and the pump cool during long periods of pumping when water is not being discharged. The cooling system shall also be 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 3/8" (inside diameter) hose. The engine cooling lines shall be installed with one (1) line going from the discharge side of the water pump through an Innovative Controls model 3008220-2-2, 3/8" in-line quarter turn ball valve assembly and continuing on to the chassis heat exchanger. The return line from the heat exchanger shall then run into the suction side of the pump. The pump cooling lines shall be installed with one (1) line going from the discharge side of the water pump through an Innovative Controls model 3008220-2-2, 3/8" in-line quarter-turn ball valve assembly up to the water tank. At the water tank, the pump cooling line shall be plumbed into a 3/8" check valve on the "Tank Fill" valve. The check valve shall prevent tank water from back flowing into the pump when the cooling system is not in use. A return line from the water tank shall be plumbed into the water pump.

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

The pump cooling system valve shall be controlled on operator's 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 proprietary Smeal black markings on a white dial.

MASTER PRESSURE CENTER ASSEMBLY

The master gauges shall be installed on the pump panel no more than 6 inches apart in an integrated master pressure assembly that includes the two (2) master gauges, audible alarm, a test port manifold, a graphic overlay that identifies the master intake with burgundy and master discharge with black, verbiage to label the vacuum and pressure test ports and a decorative chrome-plated zinc mounting bezel. The test port manifold is solid cast brass with chrome-plated plugs and is plumbed to the master gauges.

The master intake and master discharge gauges shall be 4" (100mm) diameter Innovative Controls TC series (Temperature Compensation) pressure gauges. Each gauge 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.

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

The gauge on the left shall be the master pump intake gauge and display a range from -30 to 400 PSI with proprietary Smeal black markings on a white dial. The gauge on the right shall be the master pump discharge gauge and display a range from 0 to 400 PSI with proprietary Smeal black markings on a white dial.

HARDWARE BRAND

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

The Storz discharge and intake fittings provided on this apparatus shall be Task Force Tips Brand. For corrosion resistance, the adapter shall be constructed of hard coat anodized aluminum alloy and include a polymer bearing ring for prevention of galvanic corrosion.

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

DISCHARGE, PRE-CONNECT, AND INTAKE DRAINS

An Innovative Controls 3/4" quarter turn drain valve 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.

PLUMBING LABELS

Innovative Controls brand labels shall be used to identify any pump valve controller, gauge, or drain on the apparatus. The labels shall be color coded in accordance with NFPA, current edition. compliance. The colors and verbiage of the labels shall be the OEM standard label package. Each discharge label shall have a unique color and shall have verbiage to identify it.

For easy identification of each component, the verbiage of each label shall be size 22 pt, font "Helvetica Neue Condensed Bold"

SFA is to use standard colors and verbiage on the pump panel labels.

An Akron Brass, model 8620, 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 electric actuator installed on the valve. The electric actuator shall have a 16:1 gear ratio, which actuates from fully open to fully closed in five (5) seconds, a clutchless motor, and utilizes an electric controller with current limiting design.

The electric actuator shall be controlled by an Akron Brass, model 9327, Mini Navigator Pro 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 and close. The unit shall carry a five (5) year warranty.

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 8630, 3" Swing-Out valve shall be provided. The valve shall have an all brass body with flow optimizing stainless steel ball and dual polymer seats. The valve shall be capable of dual directional flow while incorporating a specially designed flow optimizing stainless steel ball. The valve shall not require lubrication of seats or any other internal waterway parts and must be capable of swinging out of the waterway for maintenance by the removal of six bolts. The valve shall be manufactured and assembled in the United States. The valve shall carry a ten (10) year warranty by the valve manufacturer.

The valve shall be actuated by an Akron Brass electric actuator installed on the valve. The electric actuator shall have a 16:1 gear ratio, which actuates from fully open to fully closed in five (5) seconds, a clutchless motor, and utilizes an electric controller with current limiting design.

The electric actuator shall be controlled by an Akron Brass, model 9327, Mini Navigator Pro 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 and close. The unit shall carry a five (5) year warranty.

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.

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.

BUTTERFLY VALVE

A Waterous Monarch 6" butterfly valve shall be provided. The valve shall be a 6" full flow valve with a 6" NH nipple. Each valve shall be electrically operated from a solid state controller located on the pump panel. A seven light LED indicator shall show the position of the valve from fully closed to fully open. The valve shall be in accordance with NFPA, current edition., for opening and closing speed.

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

An in-line bleeder/drain valve shall be provided on the steamer inlet. The valve shall be used to bleed off air or water in accordance with NFPA, current edition.

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

One (1) 5" Storz x 6" female NH thread long handle swivel 30 degree elbow adapter shall be provided. The elbow shall be constructed of hard coat anodized aluminum alloy and have a silver powder coat finish inside and out.

One (1) 5" Storz blind cap, complete with lanyard, 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.

BUTTERFLY VALVE

A Waterous Monarch 6" butterfly valve shall be provided. The valve shall be a 6" full flow valve with a 6" NH nipple. Each valve shall be electrically operated from a solid state controller located on the pump panel. A seven light LED indicator shall show the position of the valve from fully closed to fully open. The valve shall be in accordance with NFPA, current edition., for opening and closing speed.

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

An in-line bleeder/drain valve shall be provided on the steamer inlet. The valve shall be used to bleed off air or water in accordance with NFPA, current edition.

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

One (1) 5" Storz x 6" female NH thread long handle swivel 30 degree elbow adapter shall be provided. The elbow shall be constructed of hard coat anodized aluminum alloy and have a silver powder coat finish inside and out.

One (1) 5" Storz blind cap, complete with lanyard, shall be provided.

SFA is to use standard colors and verbiage on the pump panel labels.

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 partsÂ 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 electric actuator installed on the valve. The electric actuator shall have a 16:1 gear ratio, which actuates from fully open to fully closed in five (5) seconds, a clutchless

motor, and utilizes an electric controller with current limiting design.

The electric actuator shall be controlled by an Akron Brass, model 9335, Navigator Pro valve controller. The electric controls shall be of true position feedback design, requiring no clutches in the motor or current limiting. The unit shall be completely sealed with momentary open, close as well as an optional one (1) touch full open feature to operate the actuator. Three (3) additional buttons shall be available to be used for preset selection, preset activation, CAFS activation and menu navigation. The unit shall be capable of being connected to a Pressure Sensor and provide an LCD display showing pressure as well as valve position indication. Valve position indication shall be determined from true position feedback and indicate the exact position of the valve. The unit shall be capable of being used in conjunction with at least two (2) additional displays to control one (1) valve. The unit shall be able to be programmed to Bar, PSI or kPa for pressure. The unit shall have programmed pipe sizes and be capable of custom calibration to high and low flow ranges. The unit shall also be capable of turning on and off a solenoid used in a CAFS system. The only calibration required is to set the unit to the valve during initial set up. No other calibration shall be required. The display shall be a full-color LCD display with a backlight. It shall have manual adjustment of the brightness as well as an auto-dimming option. Unit shall carry a five (5) year warranty.

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 partsÂ 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 electric actuator installed on the valve. The electric actuator shall have a 16:1 gear ratio, which actuates from fully open to fully closed in five (5) seconds, a clutchless motor, and utilizes an electric controller with current limiting design.

The electric actuator shall be controlled by an Akron Brass, model 9335, Navigator Pro valve controller. The electric controls shall be of true position feedback design, requiring no clutches in the motor or current limiting. The unit shall be completely sealed with momentary open, close as well as an optional one (1) touch full open feature to operate the actuator. Three (3) additional buttons shall be available to be used for preset selection, preset activation, CAFS activation and menu navigation. The unit shall be capable of being connected to a Pressure Sensor and provide an LCD display showing pressure as well as valve position indication. Valve position indication shall be determined from true position feedback and indicate the exact position of the valve. The unit shall be capable of being used in conjunction with at least two (2) additional displays to control one (1) valve. The unit shall be able to be programmed to Bar, PSI or kPa for pressure. The unit shall have programmed pipe sizes and be capable of custom calibration to high and low flow ranges. The unit shall also be capable of turning on and off a solenoid used in a CAFS system. The only calibration required is to set the unit to the valve during initial set up. No other calibration shall be required. The display shall be a full-color LCD display with a backlight. It shall have manual adjustment of the brightness as well as an auto-dimming option. Unit shall carry a five (5) year warranty.

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 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 partsÂ 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 electric actuator installed on the valve. The electric actuator shall have a 16:1 gear ratio, which actuates from fully open to fully closed in five (5) seconds, a clutchless motor, and utilizes an electric controller with current limiting design.

The electric actuator shall be controlled by an Akron Brass, model 9335, Navigator Pro valve controller. The electric controls shall be of true position feedback design, requiring no clutches in the motor or current limiting. The unit shall be completely sealed with momentary open, close as well as an optional one (1) touch full open feature to operate the actuator. Three (3) additional buttons shall be available to be used for preset selection, preset activation, CAFS activation and menu navigation. The unit shall be capable of being connected to a Pressure Sensor and provide an LCD display showing pressure as well as valve position indication. Valve position indication shall be determined from true position feedback and indicate the exact position of the valve. The unit shall be capable of being used in conjunction with at least two (2) additional displays to control one (1) valve. The unit shall be able to be programmed to Bar, PSI or kPa for pressure. The unit shall have programmed pipe sizes and be capable of custom calibration to high and low flow ranges. The unit shall also be capable of turning on and off a solenoid used in a CAFS system. The only calibration required is to set the unit to the valve during initial set up. No other calibration shall be required. The display shall be a full-color LCD display with a backlight. It shall have manual adjustment of the brightness as well as an auto-dimming option. Unit shall carry a five (5) year warranty.

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.

One (1) Akron Brass, model 8840, 4" Swing-Out valve shall be provided. The valve shall have an all cast brass

valve body with a 4" full flow waterway ideal for flows up to 2000 GPM and a maximum body length of 4". The valve shall utilize a bronze flat ball design with a single urethane seat and be structurally rated to 500 PSI with a 250 PSI operating pressure. The valve shall not require the lubrication of seats or any other internal waterway partsÂ and shall be capable of swinging out of the waterway for maintenance by the removal of six bolts. The valve shall carry a ten (10) year warranty by the valve manufacturer.

The valve shall be actuated by an Akron Brass electric actuator installed on the valve. The electric actuator shall have a 25:1 gear ratio, which actuates from fully open to fully closed 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, model 9335, Navigator Pro valve controller. The electric controls shall be of true position feedback design, requiring no clutches in the motor or current limiting. The unit shall be completely sealed with momentary open, close as well as an optional one (1) touch full open feature to operate the actuator. Three (3) additional buttons shall be available to be used for preset selection, preset activation, CAFS activation and menu navigation. The unit shall be capable of being connected to both Flow Sensor and Pressure Sensor, and provide an LCD display showing pressure and/or flow as well as valve position indication. Valve position indication shall be determined from true position feedback and indicate the exact position of the valve. The unit shall be capable of being used in conjunction with at least two (2) additional displays to control one (1) valve. The unit shall be able to be programmed to GPM or LPM for flow as well as Bar, PSI or kPa for pressure. The unit shall have programmed pipe sizes and be capable of custom calibration to high and low flow ranges. The unit shall also be capable of turning on and off a solenoid used in a CAFS system. The only calibration required is to set the unit to the valve during initial set up. No other calibration shall be required. The display shall be a full-color LCD display with a backlight. It shall have manual adjustment of the brightness as well as an auto-dimming option. Unit shall carry a five (5) year warranty.

One (1) 5" Storz x 4" female NH thread swivel rocker lug 30 degree elbow adapter shall be provided. The elbow shall be constructed of hard coat anodized aluminum alloy and have a silver powder coat finish inside and out.

One (1) 5" Storz blind cap, complete with lanyard, shall be provided.

CROSSLAY CONFIGURATION

Two (2) 1-1/2" and one (1) 2-1/2" crosslay pre-connects shall be located above the front of the body. 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 and shall be mounted in a channel on each end for adjustability. The dividers shall have a maintenance free abraded finish.

CROSSLAY COVER

An aluminum non-slip tread plate cover shall be installed on the crosslay hose bed. The cover shall not interfere with hose loading when in the open position. When in the open position the cover shall remain open due to automatically engaging mechanisms that require no type of latch operation to engage or release. The cover shall be provided with one full length stainless steel piano style hinge that shall attach the cover to the body. The cover shall be light yet rigid. Opening of the cover may be performed by one person on one side of the apparatus. The cover shall be rigid enough to support weight without deformation.

Shop Note: The ladder will need to be raised to open the cover.

END COVERS

A heavy duty end flap/cover shall be located on each end of the pre-connected crosslays. The top of the end covers shall be connected to the tread plate top cover through a C-Rail channel. The bottom of the cover shall be attached to the pump module utilizing hooks and bungee cord. The cover color shall be red.

Two (2) On Scene, Night Axe, 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 200' of 1-3/4" double jacket fire hose stored in a double stack.

An Akron Brass, model 8620, 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 electric actuator installed directly on the valve. The electric actuator shall have a 16:1 gear ratio, which actuates from fully open to fully closed in five (5) seconds, a

clutchless motor, and utilize an electric controller with current limiting design.

The electric actuator shall be controlled by an Akron Brass, model 9335, Navigator Pro valve controller. The electric controls shall be of true position feedback design, requiring no clutches in the motor or current limiting. The unit shall be completely sealed with momentary open, close as well as an optional one (1) touch full open feature to operate the actuator. Three (3) additional buttons shall be available to be used for preset selection, preset activation, CAFS activation and menu navigation. The unit shall be capable of being connected to a Pressure Sensor and provide an LCD display showing pressure as well as valve position indication. Valve position indication shall be determined from true position feedback and indicate the exact position of the valve. The unit shall be capable of being used in conjunction with at least two (2) additional displays to control one (1) valve. The unit shall be able to be programmed to Bar, PSI or kPa for pressure. The unit shall have programmed pipe sizes and be capable of custom calibration to high and low flow ranges. The unit shall also be capable of turning on and off a solenoid used in a CAFS system. The only calibration required is to set the unit to the valve during initial set up. No other calibration shall be required. The display shall be a full color LCD display with a backlight. It shall have manual adjustment of the brightness as well as an auto-dimming option. Unit shall carry a five (5) year warranty.

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

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 200' of 1-3/4" double jacket fire hose stored in a double stack.

An Akron Brass, model 8620, 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 electric actuator installed directly on the valve. The electric actuator shall have a 16:1 gear ratio, which actuates from fully open to fully closed in five (5) seconds, a clutchless motor, and utilize an electric controller with current limiting design.

The electric actuator shall be controlled by an Akron Brass, model 9335, Navigator Pro valve controller. The electric controls shall be of true position feedback design, requiring no clutches in the motor or current limiting. The unit shall be completely sealed with momentary open, close as well as an optional one (1) touch full open feature to operate the actuator. Three (3) additional buttons shall be available to be used for preset selection, preset activation, CAFS activation and menu navigation. The unit shall be capable of being connected to a Pressure Sensor and provide an LCD display showing pressure as well as valve position indication. Valve position indication shall be determined from true position feedback and indicate the exact position of the valve. The unit shall be capable of being used in conjunction with at least two (2) additional displays to control one (1) valve. The unit shall be able to be programmed to Bar, PSI or kPa for pressure. The unit shall have programmed pipe sizes and be capable of custom calibration to high and low flow ranges. The unit shall also be capable of turning on and off a solenoid used in a CAFS system. The only calibration required is to set the unit to the valve during initial set up. No other calibration shall be required. The display shall be a full color LCD display with a backlight. It shall have manual adjustment of the brightness as well as an auto-dimming option. Unit shall carry a five (5) year warranty.

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 200' of 2-1/2" double jacket fire hose stored in a double stack.

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 partsÂ 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 electric actuator installed on the valve. The electric actuator shall have a 16:1 gear ratio, which actuates from fully open to fully closed in five (5) seconds, a clutchless motor, and utilizes an electric controller with current limiting design.

The electric actuator shall be controlled by an Akron Brass, model 9335, Navigator Pro valve controller. The electric controls shall be of true position feedback design, requiring no clutches in the motor or current limiting. The unit shall be completely sealed with momentary open, close as well as an optional one (1) touch full open feature to operate the actuator. Three (3) additional buttons shall be available to be used for preset selection, preset activation, CAFS activation and menu navigation. The unit shall be capable of being connected to a Pressure Sensor and provide an LCD display showing pressure as well as valve position indication. Valve position indication shall be determined from true position feedback and indicate the exact position of the valve. The unit shall be capable of being used in conjunction with at least two (2) additional displays to control one (1) valve. The unit shall be able to be programmed to Bar, PSI or kPa for pressure. The unit shall have programmed pipe sizes and be capable of custom calibration to high and low flow ranges. The unit shall also be capable of turning on and off a solenoid used in a CAFS system. The only calibration required is to set the unit to the valve during initial set up. No other calibration shall be required. The display shall be a full-color LCD display with a backlight. It shall have manual adjustment of the brightness as well as an auto-dimming option. Unit shall carry a five (5) year warranty.

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

AERIAL WATERWAY DISCHARGE

A 4" discharge shall be plumbed to the aerial waterway with 5" plumbing. The plumbing shall be constructed from schedule 10 stainless steel components.

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

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

The electric actuator shall be controlled by an Akron Brass, model 9335, Navigator Pro valve controller. The electric controls shall be of true position feedback design, requiring no clutches in the motor or current limiting. The unit shall be completely sealed with momentary open, close as well as an optional one (1) touch full open feature to operate the actuator. Three (3) additional buttons shall be available to be used for preset selection, preset activation, CAFS activation and menu navigation. The unit shall be capable of being connected to a Pressure Sensor and provide an LCD display showing pressure as well as valve position indication. Valve position indication shall be determined from true position feedback and indicate the exact position of the valve. The unit shall be capable of being used in conjunction with at least two (2) additional displays to control one (1) valve. The unit shall be able to be programmed to Bar, PSI or kPa for pressure. The unit shall have programmed pipe sizes and be capable of custom calibration to high and low flow ranges. The unit shall also be capable of turning on and off a solenoid used in a CAFS system. The only calibration required is to set the unit to the valve during initial set up. No other calibration shall be required. The display shall be a full color LCD display with a backlight. It shall have manual adjustment of the brightness as well as an auto-dimming option. Unit shall carry a five (5) year warranty.

SFA is to use standard colors and verbiage on the pump panel labels.

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 600 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
- One (1) amber LED turn light with arrow
- One (1) clear LED backup light

The lights shall be mounted in a chrome plated four (4) light composite housing. The remaining slot in the housing shall be populated with a warning light specified in the warning light section.

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) Truck-Lite model 21 LED midship auxiliary/turn signal lights shall be installed in the rub rail, one (1) on each side of the body.

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 shall be activated when the parking brake is engaged.

CLEARANCE LIGHTS

Grote red LED clearance lights shall be installed in the outside corners of the rear bumper and a Truck-Lite bar cluster located in the lower middle portion of the rear of the apparatus. 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.

CAMERA CHASSIS SUPPLIED

An FRC branded InView 360 heavy duty 360 degree camera system powered by SEON shall be supplied by the chassis . Three (3) ultra wide 1080p cameras with surface mount housings shall be shipped loose for Smeal installation in the body to afford the driver a clear view to the rear and sides of the vehicle and one (1) chassis installed camera shall be mounted on the front of the cab, above the windshield.

The system shall provide a dual camera view. One (1) view shall be a stitched bird's eye 360 degrees view around the truck and one (1) shall be a direct feed from a single camera. This feed shall display the rear camera when the transmission is placed in reverse, the left or right camera with the activation of the respective side turn signal, or the front camera at all other times.

The cameras shall be wired to the Vista screens.

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.

UPPER ZONE C

Two (2) Whelen RB6 Series rotating beacons shall be installed in Upper Zone C, high at the rear of the apparatus. The 130 FPM single reflector halogen beacons shall incorporate one 12V/60W snap-in halogen lamp, metalized reflector, and a non-optic hard coated polycarbonate lens. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The beacons motorized assembly shall include a double roller ball bearing design and motor/worm assembly that produces minimal friction and reduced noise. The beacon dome lenses shall be sealed to a non-corroding base with an "O" ring gasket and

clamp ring assembly. The solid state halogen beacon lights shall be vibration resistant.

The driver's and officer's side lights shall both have red LED and red lenses unless otherwise specified.

LOWER ZONE WARNING LIGHT PACKAGE

Four (4) Whelen 600 Series Super-LED lights with chrome-plated flanges shall be installed in the lower zone of the apparatus to be in accordance with NFPA, current edition. compliance. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The conformal coated PC board and sealed lens/reflector assembly shall provide additional protection against environmental elements. The solid state warning lights shall be vibration resistant.

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

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".

12V POWER LEAD DROP

One (1) 12 volt power lead drop with a 6-position Blue Sea Systems ATO style fuse block with cover shall be provided. The power lead drop shall consist of one (1) hot and one (1) ground wire run from the batteries to the specified location. The power lead drop shall be battery direct and have a minimum of a 30 amp fuse provided with the power circuit. The distribution panel shall be designed with a grounding pad and compact, lightweight construction. The distribution panel shall be capable of using ATC/ATO blade fuses or ATC style DC circuit breakers.

The power lead 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.

Shop Note: Install on the front side wall of the compartment, up high

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One (1) 12 volt power lead drop with a 6-position Blue Sea Systems ATO style fuse block with cover shall be provided. The power lead drop shall consist of one (1) hot and one (1) ground wire run from the batteries to the specified location. The power lead drop shall be battery direct and have a minimum of a 30 amp fuse provided with the power circuit. The distribution panel shall be designed with a grounding pad and compact, lightweight construction. The distribution panel shall be capable of using ATC/ATO blade fuses or ATC style DC circuit breakers.

The power lead 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.

Shop Note: Install on the front side wall of the compartment, up high

LED BROW LIGHTÂ

Two (2 HiViz LEDs "FireTech" Scene light model FT-B-46-W shall be provided. The light instrument shall be low in profile with a trunion mounting bracket. The housing shall be made of a extruded 6061 aluminum; 46" wide and less than 3" tall.

Each light shall come with 36 LEDs and produce 19,008 RAW Lumens. Each light requires 15.0 amps, which at 12V will require 150 Watts.

Mounting shall be possible in any direction while still meeting NFPA 1901 compliance requirements. The housing color shall be white.

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

Shop Note: Recessed

The driver's side and officer's side scene light(s) shall be controlled by a switch located on the V-Mux 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 V-Mux display and the pump panel switch shall be labeled "LEFT SCENE" and the officer's side shall be labeled "RIGHT SCENE."

GENERATOR

A Harrison hydraulic driven generator shall be installed on the apparatus. The continuous duty rating of the generator shall be 10,000 watts, 42/83 amps, 120/240VAC volts. Current frequency shall be stable at 60 hertz.

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

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

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

The hydraulic motor and pump shall be of axial piston design to provide low internal leakage and a high degree of frequency stability. No gear pumps or motors shall be used. The pump shall match the system with the

proper orifice, pressure compensator, and load sense settings to provide stable output regardless of engine rpm or electrical load demands.

The system shall be capable of normal operations using a commonly available 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 metering 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.

Shop Note: Display to be mounted on the pump panel

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 ahead of the turntable.

16 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 back wall of the L1 compartment.

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.

Shop Note: Install on the front side wall of the compartment, up high

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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.

Shop Note: Install on the front side wall of the compartment, up high

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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 L3 compartment.
The exact location will be determined by the apparatus manufacturer, unless a specific location is clarified in the shop note.

Shop Note: Install on the front side wall of the compartment, up high

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 R3 compartment.
The exact location will be determined by the apparatus manufacturer, unless a specific location is clarified in the shop note.

Shop Note: Install on the front side wall of the compartment, up high

ELECTRIC CORD REEL

A Hannay 120 volt electric rewind cord reel shall be installed on the apparatus. A push button labeled "REEL REWIND" shall be installed for 12-volt rewinding of the cord reel.

Rollers shall be supplied to prevent damage to the electrical cable if pulled in any direction.

The cord reel shall be equipped with 200' of yellow STW Seoprene 10/3 wire installed with a cable stop to prevent damage to cable fittings. The cord shall terminate in a single L5-20 twist lock receptacle.

JUNCTION BOX

An Akron Brass Extenda-Lite, model EJBX, backlighted electrical junction box equipped with four (4) electrical receptacles, two (2) per side, shall be provided. Each receptacle shall be equipped with a spring loaded snap cover. The cord reel shall be connected to the cast aluminum junction box through a 12" pigtail with heavy duty water resistant strain relief and flexible extender. The pigtail shall utilize an L5-20 twist lock plug and connector to supply power to the receptacles. Each side of the junction box shall be fitted with polypropylene faceplates, which are backlighted, so that plug orientation to the receptacles is quick and easy to align.

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

Shop Note: Rewind switch to be in compartment L3. Use best judgement for installation location

The junction box shall have a gray powder-coat finish.

One (1) NEMA 5-20R, 120 volt, duplex, 3-wire, straight blade (household type) receptacle shall be installed on the junction box.

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The cord reel shall be located on top of the body above the L3 compartment.

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

Shop Note: Mount at final inspection

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

Shop Note: Mount at final inspection

100' MID MOUNT PLATFORM CONSTRUCTION STANDARDS

The aerial platform shall be of mid-mount design, with the turntable located directly and immediately behind the chassis cab. While in the stowed position, the aerial ladder sections shall extend backward to the rear of the

apparatus. The aerial ladder shall be comprised of five sections and shall extend to a nominal height of 100' at 72 degrees, measured in a vertical plane from the platform handrail to the ground. To maintain a maximum level of safety, units exceeding a 76 degree angle of inclination, in accordance with NFPA 1931/1932, current edition, shall not be acceptable.

OPERATIONAL ENVELOPE/REACH

The aerial ladder shall have an operations range of -12 degrees elevation to +72 degrees elevation.

While on a flat surface a minimum vertical reach of 100' shall be measured from the ground to the top of the handrail of the platform while at maximum extension and elevation.

A minimum horizontal reach of 99' shall be measured from the turntable centerline to the leading edge of the platform with the aerial at 0 degrees elevation.

Reach and height shall be measured in accordance with NFPA, current edition.

STRUCTURAL MATERIAL

The primary load support members of the ladder shall be constructed of certified 70,000 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 beÂ 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 - 49.000"
- First Fly Section - 41.250"
- Second Fly Section - 34.375"
- Third Fly Section - 27.500"
- Last Fly Section - 21.750"

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

- Base Section - 35.875"
- First Fly Section - 30.375"
- Second Fly Section - 26.375"
- Third Fly Section - 22.875"
- Last Fly Section - 19.375"

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 not exceed 50% of the minimum as welded yield strength of the material based on the combination of the dead load of the aerial plus the rated capacity of 500 lbs. wet, or 1,000 lbs. dry at the tip of the aerial; while flowing 1500 GPM, at a 90 degree angle to ladder centerline; with the structural load supporting members of the aerial device at either; an ambient temperature of 75 degrees F or an elevated temperature of 350 degrees F- thereby exhibiting a minimum 2.0:1 safety factor in all feasible operational conditions. These capabilities shall be valid and true when the apparatus is deployed in the unsupported configuration, based upon 360-degree rotation, up to full extension, and at any degree of elevation (-12 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 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 shall be provided for support of the ladder in the travel position. The travel support shall be fabricated from heavy duty steel tubing 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 when necessary.

The base section of the ladder shall contain stainless steel scuff plates where the ladder comes into contact with the ladder support.

An indicator light shall be provided on the turntable to indicate when the ladder is aligned with the travel support and may be lowered into it. The ladder rest shall be attached to the torque box for added stability.

The ladder rest shall be illuminated for night time operation. The illumination light shall automatically turn on

with the aerial master switch.

A hold-down mechanism shall be installed on each side of the ladder travel support that keep the aerial structure from bouncing due to road hammer. The system shall be designed in such a manner to automatically unlatch the hold-downs when the aerial hydraulic system is activated. The hold-downs shall automatically lock in the road position when the hydraulic system is shut down.

CRADLE INTERLOCK SYSTEM

A cradle interlock system shall be provided to prevent the lifting of the ladder from the nested position until the operator has positioned all of the stabilizers in a load supporting configuration. A switch shall be installed at the cradle to prevent operation of the stabilizers once the aerial has been elevated from the nested position.

ELEVATION SYSTEM

Two (2) double acting lift cylinders shall be utilized to provide smooth precise elevation from -12 degrees below horizontal to 72 degrees above horizontal. The lift cylinders shall have a 7" internal diameter (bore) and a 4" 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, to limit the downward pull of the ladder when it is bedded. Both raising and lowering functions shall be influenced by flow compensation, which shall maintain ladder tip speed within the design speed regardless of load, angle, or extension. Ladder tip speed shall be decelerated above 65 degrees in order to reduce "tip-lash". Ladder lowering shall be controlled on the down motion to prevent the cylinders from completely retracting, thus allowing a cushion of oil for continuous ladder load readout.

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 4.0" internal diameter (bore) and a 2.0" diameter solid rod with a 51.50" stroke. 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 holding valves shall be mounted directly on the cylinders with no hoses between the valve and the cylinder.

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 as well as to prevent personnel on the ladder from becoming entangled in them.

HIGH DUTY CYCLE SHEAVE BEARINGS

For maximum performance in high duty cycle environments, the aerial sheaves shall be provided with bearings made from type 660 bearing bronze. This bronze alloy shall be hard, strong and resistant to wear and galling.

A grease zerk shall be provided for each sheave bearing for reliable, long-term performance.

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-inch diameter internal 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 shall be machined to match, providing an even distribution of forces and reducing the chance of fracturing the bearing.

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 unit.

The hydraulic system shall be equipped with pressure relief valves, which shall limit the rotational torque to a nondestructive power. All moving parts of the rotation gear reduction box shall be enclosed or under the turntable decking so that no safety hazards are present.

ROTATION INTERLOCK SYSTEM

The aerial device shall be equipped with a rotation interlock system to prevent the ladder from being rotated to any side where the stabilizers are not sufficiently extended to provide for the full tip load rating.

The system shall monitor the stabilizers for extension. When a stabilizer is not sufficiently extended (short-jacked) to provide full tip load rating, the system shall prevent the aerial from being rotated more than 12 degrees past the front or rear center line into the short-jacked side of the apparatus.

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.

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.

Each control shall be a spring loaded momentary switch. A red indicator light shall be mounted adjacent to each switch to indicate activation of the emergency pump.

HYDRAULIC SWIVEL

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

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

An additional angle indicator shall be on the fly section near the platform. The angle indicator shall be backlit for 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" sub frame 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 sub frame 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 located directly behind the pump mount area and at the front of the rear stabilizer housing assembly.

The torque box shall have a section modulus of 673.6 cubic inch and a resistance to bending moment of 24,249,188 inch pounds.

The torque box shall be shot blasted to remove any mill scale or contamination. The torque box 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 this critical component.

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.

FRONT AND REAR STABILIZERS

Two (2) sets of stabilizers shall be installed for stability. Each set of stabilizers shall have an 18' spread, measured from the outermost edge of the stabilizers on each side of the apparatus. Both sets shall be an extending box beam "H" style. 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 front stabilizers shall be located directly behind the chassis cab, attached to the torque box, for maximum setup ability with minimal cab deflection, and to minimize the amount of loading transferred to the chassis frame. Designs that mount these stabilizers solely to the chassis frame shall be unacceptable due to the twisting force they impart on the chassis frame.

The rear stabilizers shall also be integral with the torque box and shall be installed behind the rear axle of the apparatus.

The stabilizers shall be double box design with jack cylinders that have a 5" internal diameter (bore) and a 2.5" diameter 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 warning 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 polished stainless steel stabilizer cover. The cover shall be adjustable to allow for a proper fit.

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

STABILIZER STROKE

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

STABILIZER FINISH

The extending front/rear stabilizer beams, inner jack tubes, and stabilizer pads shall be 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 front beams shall be activated by dual extension cylinders, which shall each have a

2.50" internal diameter (bore) and a 1.5" 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 shallÂ be 8.00" x 10.00" x .375" wall steel tubing with a 1.50" steel plate welded to the top and 1.50" steel plate welded to the bottom of each beam.

Extension of the horizontal rear beams shall be activated by dual extension cylinders, which shall each have a 2.00" 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 8.00" x 6.00" x .375" wall steel tubing with a .625" steel plate welded to the top and .625" steel plate welded to the 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 view 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 brushed 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 brushed 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 2" 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 600 Series Super-LED flashing light shall be installed on each extending stabilizer cover panel, for a total of four (4). These lights shall be red in color and activated by the aerial master switch and emergency master switch.

Shop Note: Red LED's, Red Lens

STABILIZER ARM WARNING LIGHTS

Eight (8) 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

Four (4) Truck-Lite LED clear floodlights 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 98" side to side and 78" 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 possibleÂ 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 trained mechanic.

TURNTABLE HANDRAILS

There shall be three (3) handrails, each shall be of one piece construction and provide large sweep corners at the edge of the turntable. Each shall be 42" high and shall be constructed of 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 three (3) openings in the handrails, two (2) for access from the ladders and one (1) in the center.

TURNTABLE RESTRAINTS

Two (2) FRC ManSaver Bars, without covers, and one (1) stainless steel chain shall be installed in the spaces between the handrails. All items shall be permanently attached at one end.

TURNTABLE WORK LIGHTING

The turntable shall be lighted for night time operation with two (2) 9" On Scene Night Axe lights, 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.

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 night time operation and have a hinged weather cover. A pressurized gas filled cylinder shall be furnished on the cover to hold it in the open position. The gas filled cylinder shall assist in closing the cover automatically when it is positioned over 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 in the platform.

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
- Platform master switch
- Intercom with controls
- Operators load chart
- Warning signs

PLATFORM MASTER SWITCH

A platform master switch shall be located at the turntable console that shall have the ability to enable control of the aerial apparatus at the platform position. The turntable position shall still be the master position and will still be able to override the platform controls.

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.

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

The Loadminder shall be connected to a 100 db. alarm at the operator's control station that sounds 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.

AIR HORN ACTIVATION

An air horn button shall be provided on the aerial turntable console. The button shall be red in color and include a label reading "AIR HORN".

AERIAL PLATFORM LOAD CHARTS

Two (2) load charts shall be installed on the aerial platform; one (1) at the turntable control console, and one (1) in the platform at the tip of the aerial. The load charts shall illustrate the full operating range of the platform, with the waterway dry or flowing water.

AERIAL COMMUNICATION SYSTEM

An Atkinson Dynamics two (2) station communication system shall be provided between the aerial platform and the turntable control console. The communication system shall be a two-way system with the communication speaker at the platform requiring no operator attention to transmit or receive. The transmitting and receiving volume controls shall be located at the turntable control console.

ALIGNMENT ARROWS

There will be painted aluminum ladder alignment arrows installed on the apparatus. The arrows will be placed one (1) on the top surface of the turntable near the control station and the other arrow will be place on the top of the body so that they are lined up when the ladder is bedded.

The color that the arrows shall be painted will be determined by the apparatus manufacturer, unless a specific color is clarified in the shop note.

TRACKING LIGHTS

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

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

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

MID MOUNT PLATFORM DESIGN AND CONSTRUCTION - SINGLE MONITOR

The platform frame shall be constructed of certified 6061-T extruded aluminum tubing and certified plate as a minimum. The construction of the platform frame shall be modular, with each module being welded in fixtures to ensure tight tolerances, prevent warpage, and eliminate excessive annealing. In an effort to account for theÂ maximum working area inside of the platform, any design having less than 18 square feet of working area shall not be considered acceptable.

Platforms that are not of modular construction shall not be acceptable due to extreme warpage during welding (causing base material damage and poor component fit). Additionally, the inability to replace a portion of the platform should it become damaged during rescue/firefighting operations.

When completed, the individual modules shall be assembled with certified structural fasteners.

The finished assembly shall be attached to the aerial ladder in a manner that shall be easily replaceable should it become damaged.

Heavy duty, extruded rubber bumpers shall be provided on the underside of the platform frame for safe "landing" on rooftops or the ground.

This style of aÂ platform shall be able to accommodate a single monitor.

PLATFORM DECK SURFACE

The floor of the platform shall be aluminum grating with an aggressive serrated surface. This decking shall provide excellent footing in all environments and working conditions. Simple bar type grating or tread plate shall not be acceptable because they become slippery under many conditions or do not sufficiently shed liquids.

To provide theÂ maximum working surface for victim rescue, the aggressive decking shall extend outside of the enclosed portion of the platform a minimum of 4" on the sides and 10" on the front. The front and side leading edges of the platform shall be protected by a heavy duty, "D" type extruded rubber bumper.

The decking shall be of a design that shall allow debris to fall through to the anodized aluminum heat shield underneath. This design shall prevent debris from interfering with operator footing, yet shall prevent the debris from falling below the platform.

PLATFORM DECK WORK LIGHTING

Optronics mini LED lights shall be installed for platform deck working lights. The lights shall provide adequate lighting within the platform to illuminate the entire floor area during nighttime operations. The lights shall be hooded to direct all light downward and shall automatically energize anytime the aerial system is activated. The lights shall be installed inside of the platform in such a manner to prevent damage during operation by moving or shifting equipment in the platform.

PLATFORM ACCESS GATES

Two (2) gates shall be supplied at the front of the platform. Each gate shall have a positive latching mechanism that can be operated from inside or outside of the gate. The latch shall require no operation to close the gate. Each gate shall be double hinged in such a manner that it may be fully opened while the platform's leading front edge is against a building. The double hinged doors shall operate in a manner to allow personnel and victims to get in and out of the platform without having to move to allow the doors to swing. All hinges shall be stainless steel piano style. Automatically engaging and disengaging provisions shall be made to positively hold each gate in the fully open position.

Each gate shall be capable of withstanding a 1000 pounds of force applied in the least favorable position and the least favorable direction, without opening outward.

Additional safety shall be provided by a hinged safety bar above each gate entrance, which may remain closed while the gate is open and still allow personnel to egress to and from the platform. This bar shall have a large sweep corner and be completely covered with deeply serrated rubber sheathing for outstanding grip in all environmental conditions. The safety bar shall be provided with a positive latching mechanism that can be operated from both sides of the platform. The latch shall require no operation to close the safety bar.

GROUND TO PLATFORM ACCESS GATE

The platform shall be designed with a rear access gate that will allow personnel to climb the ladder located at the driver's side rear of the body. The gate shall be located on the rear wall of the platform, driver's side. A swing-in positive-latching door shall be installed.

Each gate shall be capable of withstanding a 1000 pounds of force applied in the least favorable position and the least favorable direction, without opening outward.

PLATFORM CONTROL STATION

Controls for the platform functions shall be located front and center of the work area in a manner that is consistent with the pedestal at the base.

The console shall be constructed of a smooth aluminum plate and shall be painted to match the existing construction. The controls shall be widely spaced to allow for easy operation with a gloved hand. The center of the control console shall have a removable plate where the extension, elevation, and rotation controls are located.

The extension, elevation, and rotation control levers shall be spring loaded joystick type controls with an automatic lockout feature that prevents operation of the control if it is merely bumped or accidentally actuated. No Exception shall be allowed to this design, as any accidental movement of the platform shall be unacceptable.

A minimum of two (2) control panel illumination LED lights shall be provided to illuminate the control console during night operation. The lights shall be mounted above the panel surface to cast maximum illumination on the panel's surface. The lights shall be hooded so that all light is directed toward the panel and not at the operator.

The control console surface shall be fabricated from aluminumÂ 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.

All wiring and hoses shall be routed in such a manner (hidden) that there be no possibility of snagging or damage by the operator or occupants during operations.

Controls within the platform area shall include:

- Elevation, extension and retraction controls
- Platform safety override leveling button and light
- Water curtain control
- Loadminder readout with alarm
- Two hooded control station panel illumination lights
- Monitor function controls
- Intercom
- Warning signs
- Three-position speed selector switch

SHIFT ON THE FLY" PLATFORM SPEED SELECTOR SWITCH

A "Shift On The Fly" speed selector switch shall be located at the platform control station. This speed selector shall provide the operator in the platform with unmatched operation capabilities for use during all situations and operations.

The switch shall have three (3) positions consisting of high, medium and low-speed settings. By positioning the "Shift On The Fly" speed selector in one of these three positions, the speed of the aerial functions may be

finitely controlled, and quickly and safely changed from the platform control station.

POSITION 1:

"High" This position allows the platform to operate at the maximum allowable speed setting of each aerial function.

POSITION 2:

"Medium" This position allows the platform to operate at approximately 50% of the maximum allowable speed setting of each aerial function.

POSITION 3:

"Low" This position allows the platform to operate at approximately 15% of the maximum allowable speed setting of each aerial function.

"SHIFT ON THE FLY" OPERATIONS

While the platform is moving in any direction at any speed, the operator may choose to "Shift On The Fly" to a different speed; either slower or faster, without having to stop platform movement or "feather" a control. This design and capability is unequaled within the industry and allows the operator to achieve consistent and reproducible operational speeds.

Additionally, the "Shift On The Fly" design allows less experienced operators to be more consistent and perform safer operators due to the fact that they need not become accustomed to "feathering" the joystick control to achieve differing speeds. Instead, they need only fully actuate the joystick and then utilize the "Shift On The Fly" feature.

Designs that require the operator to rely solely on "feathering", the function control handle in the platform to change the speed of any function, shall be unacceptable.

No Exceptions shall be allowed to this design in the interest of operator safety and enhanced platform operation capabilities.

PLATFORM CONTROLS SYSTEM LOCK

There shall be a platform control system lock at the platform control console. The platform control system lock switch shall be a push/pull systems engagement control. The control shall disable the platform controls at the platform control console, but still allow platform and ladder movement from the turntable control console.

AUTO RAMP PLATFORM CONTROL

Platform elevation, extension, and rotation function controls in the platform shall be equipped with an electric "Auto Ramp" feature. This ramping feature shall allow the operator in the platform to engage the controls abruptly without resulting in "tip lash" or sudden jerking of the platform.

When one of the above controls is engaged or disengaged abruptly; the hydraulic pressure shall "Auto Ramp" up or down to the speed the function level is being held at, thus providing a smooth transition from start to stopÂ or stop to start. No Exception shall be allowed to this design in the interest of operator safety.

The "Auto Ramp" feature additionally shall aid less experienced operators in safely and successfully operating the platform.

AUTOMATIC EXTENDING PLATFORM EGRESS HANDRAILS

Automatically extending handrails shall be provided between the rear entrance to the platform and the tip of the fly section. These handrails shall be constructed of a minimum 1-1/4" tubing and shall be covered full length with deeply serrated rubber sheathing for maximum grip in all environments.

The handrails shall effectively maintain a plane consistent with the fly section handrails as the aerial platform is elevated and extended and shall serve to aid in the transition to and from the platform, by extending the handrails of the fly section to meet the rear of the platform. In order to provide the maximum amount of safety for personnel entering and exiting the platform, handrails that are attached only to the platform or the fly section, and not both, will not be considered acceptable.

Additionally, two (2) or more chrome grab handles shall be provided in the rear opening of the platform to aid in the transition.

FALL PROTECTION EQUIPMENT "D" RINGS

A minimum of four (4) heavy duty "D" rings shall be installed in the platform to allow attachment of safety belts/fall protection equipment. The rings shall be installed in a manner to allow occupants in any location within the platform to be safely anchored.

PLATFORM HEAT SHIELDING

The rear, sides, front, front gates, and the entire underside of the platform shall be covered with smooth anodized aluminum sheet material to act as heat shields and protect platform occupants. The heat shields shall also serve to protect the platform structure from excessive heat exposure by reflecting heat energy, and by inhibiting heat transfer from the shields to structural members due to theÂ spacing between the shields and the structure.

The heat shields shall be attached to the platform utilizing stainless steel fasteners. The fasteners shall be installed with protective nylon washers with shoulders. This design shall allow easy removal and replacement of any heat shield should it become damaged during rescue/ firefighting operations.

Designs that allow "permanent" attachment of the heat shields shall not be acceptable for the above reason. "Permanent" shall be defined as rivets, welding, or integral with the platform in any way.

To further protect from any heat below the platform, a water curtain nozzle with a circular pattern shall be mounted in the center of the underside of the platform. This device shall be electrically actuated from the platform control station and provide a minimum of a 75 GPM spray.

Additionally, the heat shields on the underside of the platform shall serve to prevent debris or small equipment that has passed through the serrated aluminum grating decking from falling from the platform. This design shall keep the debris from interfering with operator footing.

The heat shield shall be designed to allow for easy cleaning with a water hose or spray nozzle without having to remove the shields to clean their top sides.

PLATFORM LEVELING SYSTEM

An electronic over hydraulic platform leveling system shall be installed, self-contained within the platform. The system shall electronically monitor the position of the platform relative to the earth and not the position of the apparatus should it be sitting on uneven ground. Each individual leveling cylinder shall contain two (2) counterbalance valves to assure equal distribution of load. A failsafe system shall freeze the position of the

platform if it should become more than four degrees out of level with the earth for a period of 2 seconds. This system shall prevent the platform from tipping forward in an unlikely event such as a hydraulic line break or electrical system malfunction.

An override button shall be provided to allow the operator to reset the platform and regain control of all function.

LOAD LIFTING EYES

Two (2) load lifting eyes shall be installed on the underside of the platform. The eyes shall be sufficiently spaced to allow even balancing of a load. The eyes, as a pair, shall be rated not to exceed the tip load of the ladder structure.

Permanently attached aluminum alloy labels shall be installed adjacent to the eyes. The labels shall state the rated capacity of the eyes. The information on the labels shall be professionally engraved or stamped into the label for lasting quality.

PARAPET GROUND LADDER ATTACHMENT

A removable ground ladder attachment mechanism shall be located at the front of the single monitor platform. This mechanism shall provide a temporary attachment for a 14' or shorter certified ground ladder to aid the department in clearing a parapet wall.

The mechanism shall be designed to minimize interference with other platform components such as monitors, nozzles, and swing-out gates. The design shall utilize the insertion of two (2) solid shaft pins through the hollow rungs of the ground ladder.

For maximum security, the ground ladder shall rest within the attachment mechanism at two (2) points, near the height of the platform handrails and near the platform floor area.

Shop Note: The lower bracket for the parapet will have an abraded finish. No Paint.

PLATFORM RAPPELLING ARM WITH STOKES MOUNTING

One (1) 500 lb. capacity rappelling arm shall be mounted on the front of the aerial platform. The arm shall be capable of folding into a stored position, yet remain permanently attached to the platform for safety reasons. To maintain a rigid, safe structure; the arm itself shall not have any hinging in its structural members. The arm shall be equipped with two (2) rappelling eyes to attach rappelling gear or a Stokes basket safely and quickly. Detachable arms that require the operator to physically install it for operation shall be unacceptable, regardless of design, for safety reasons.

The arm shall be permanently mounted and utilize a spring loaded, locking pivot. When pivoted into a working position, the arm shall automatically lock into that position. When the arm is in the stowed or operational position, it shall not interfere in any manner with the operation of the monitor(s), spotlights, or platform gates.

Specifically, the arm shall be mounted as close to front and center as possible to help ensure that any applied load is centered. Platform arms that are mounted on or near the corner(s) of the platform shall not be acceptable due to their off-center location.

There shall be provisions made in the design of the platform that shall allow for a Stokes basket to be temporarily but securely mounted on the platform for rescue operations.

The design of the platform shall ensure that normal access to the platform control station for normal operation is attainable when a Stokes basket is being utilized in a rescue condition.

The design shall utilize two mounting brackets, Kinedyne Track Fitting, that shall be located on the inside of the platform.

One (1) set of securing straps with spring loaded latch assemblies, shall be supplied that securely hold a Stokes basket on the side hand rail assembly of the platform back wall area and the lifting arm device located on the front of the platform.

PLATFORM EQUIPMENT STORAGE BOX

An equipment storage box shall be provided on the platform. The storage box shall be constructed of smooth aluminum plate, and shall be painted to match the existing platform structure. The box shall be located on the rear / outside walls of the platform. The box shall be constructed to be weather tight and come with a painted aluminum hinged lid and a lift and turn latch that is easily operated with a gloved hand. The box shall be suitable for storage of tools and air masks / equipment.

FLY SECTION MOUNTED AXE

An axe mounting bracket and retention strap shall be installed on the fly section.

One (1) Fire Hooks Unlimited, model FAP-6, pickhead axe with fiberglass handle shall be provided.

MID MOUNT PLATFORM MARKER LIGHTING

A minimum of three (3) red LED marker lights shall be installed on the front of the platform to provide additional marker light capabilities. These lights shall be required when the standard marker lights on the rear of the body are blocked by the platform.

PLATFORM LED WARNING LIGHTS

Four (4) Whelen 600 Series Super-LED lights shall be installed on the platform. The LED lights shall be installed one on each side of the platform and two on the front of the platform. The LED lights shall be red in color and flash any time the parking brake is released and the emergency master has been activated. All LED lights shall be wired through the aerial device swivel.

AERIAL WIRING

The AC 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.

A load center shall be installed on the rear face of the platform with breakers for each 120V component located on the platform.

120V RECEPTACLE

One (1) NEMA 5-20R, 120-volt, single, 3-wire, straight blade duplex receptacle shall be installed on the officer's side inside of the rear wall of the platform. The receptacle shall have a 20-ampere rating and include a spring-loaded weather resistant cover if mounted in an exterior location. The receptacle shall be wired to the onboard generator.

WHELEN PIONEER PLUS TIP LIGHT

One (1) Whelen PFH1P1 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 3" 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 6.5 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 light shall be located on the front center of the aerial platform.

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

WHELEN PIONEER PLUS TIP LIGHT

One (1) Whelen PFP1 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 14" wide by 4-1/4" high by 2-7/8" 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 .625 amps at 120 Vac. 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 lights 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 light shall be located on the front center of the aerial platform.

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

WHELEN PIONEER PLUS LANDING LIGHTS

Two (2) Whelen Pioneer Plus PFP2 recessed landing lights shall be installed and partially recessed into the underside of the platform. The lights shall aid the operator when "landing" the platform on a surface by clearly illuminating the area under the platform. Each housing shall incorporate internal heat-dissipating fins.

Each lamp head shall have, dual lamp, 120AC, 1.25 amps, 150 watts, 11,000 usable lumens and the housings shall be powder coated white. The floodlights shall be UL listed as scene lights for fire service use.

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

WHELEN PIONEER PLUS TELESCOPING LIGHTS

Two (2) Whelen PFP1 Pioneer Plus Super-LED lights on side mount pull-up poles shall be mounted on the platform.

Each light shall be a Whelen Single Panel Super-LED floodlight. The rectangular extruded light fixture with die cast end caps shall measure 8-3/16" wide by 4-1/4" high by 2-7/8" deep and have a white powder coat finish. Each light fixture shall have a single panel of (2) horizontal clusters of LED lamps with a molded vacuum metalized reflector that draws .625 amps at 120 Vac. The lights shall be mounted with an aluminum adapter plate attached to the pole with a switch box with On-Off toggle switch included, and a locking swivel joint with a 3/4" diameter NPT threaded base to allow the lights to be manually tilted up/down and locked in position by the operator. There shall be a removable handle standard on each lighthead. Each light shall have the Whelen lifetime warranty.

The light shall be complete with one (1) Whelen Pioneer 3000 series side mount top adjust pull-up pole. The pole shall have 12" outer body and custom length silver pole assembly with a 3C Internal input. The pole shall have a white powder coat finish. The pole shall have silver powder coated stand-off 3" non-adjustable mounting brackets.

The lights shall be located on the rear face of the back wall of the aerial platform, one (1) on the driver's side and one (1) on the officer's side.

WATERWAY SYSTEM

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

A 5" outside diameter pipe shall be connected to the water supply on one end and to a water swivel at the rotation point of the turntable. The swivel shall allow the ladder to rotate 360 degrees continuously while flowing water.

A 4" inside diameter pipe waterway shall be routed through the rotation point swivel up to the heel pin swivel. The heel pin swivel shall allow the water to flow to the waterway while elevating the aerial ladder from -12 degrees below to +72 degrees above horizontal.

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

WATERWAY PIPE DIAMETERS

The integral telescopic waterway system shall consist of a 5-1/2" outside diameter steel pipe in the base section, a 5" diameter pipe on the second section, a 4-1/2" outside diameter pipe on the third section, a 4" outside diameter pipe on the fourth section, and a 3-1/2" outside diameter in the fly section.

CP-84 CHROME PLATED WATERWAY

The CP-84 telescopic waterway shall be composed of high quality 84K PSI steel. The pipes shall be professionally prepared to accept a highly durable, hot dipped galvanizing coating. Preparation shall include

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 AkzoNobel paint of job color.

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 5" inlet, with 5" plumbing, shall be installed on the officer's side pump panel of the apparatus to be used for supplying the aerial waterway.

A 5" NPT X 5" NH thread chrome waterway adapter with screen shall be provided.

One (1) 5" Storz x 5" female NH thread swivel rocker lug 30 degree elbow adapter shall be provided. The elbow shall be constructed of hard coat anodized aluminum alloy and have a silver powder coat finish inside and out.

One (1) 5" Storz blind cap, complete with lanyard, shall be provided.

AKRON BRASS STREAMMASTER II MONITOR

An Akron Brass StreamMaster II 3480 all electric monitor shall be installed at the end of the aerial waterway. The monitor shall be constructed of lightweight Pyrolite with a 4", 150-pound flange inlet and 3-1/2" thread outlet with cast-in turning vanes in each elbow shall be provided. The monitor shall not to exceed 15" high and 11-5/8" wide. The standard absolute position sensors provide advanced features like programmable obstacle avoidance, oscillation, and stow/deploy positions. The onboard, fully sealed IP 67 CAN control system features 'plug and play' installation with built-in wireless capability and a USB port for quick software updates in the

field.

The Universal II (U2) control system shall include coated, solid state components to resist water corrosion and two (2) multi-pin interface connectors. The control system will have the capability to automatically lower the nozzle to below 90 degrees elevation in order to prevent the nozzle from coming into contact with the fly section when retracting the waterway. Each operator station shall be able to control the vertical and horizontal rotation of the monitor and the pattern of the nozzle. The lower operator station will override the upper operator station when operated simultaneously.

MONITOR COLOR

The monitor shall be painted white, Sherwin Williams #57433, by the monitor manufacturer and shall not be repainted by the OEM.

NOZZLE

An Akron Brass, model 5178, Akromatic electric combination fog and straight stream master stream nozzle shall be provided. The nozzle shall be equipped with an automatic flow mechanism that provides a flow range of 500 to 1500 GPM at 80 PSI. The nozzle shall be constructed of durable, lightweight Pyrolite and shall have electric 12 volt motor for pattern selection from straight stream to wide fog, grease fitting for maintenance, and a 3-1/2" NH thread swivel base.

MONITOR SWEEP

The monitor shall be capable of vertical positioning from -45 degrees to 45 degrees and horizontal positioning of 90 degrees from side to side for a full 180-degree sweep.

MONITOR SHUT OFF VALVE

A monitor shut off valve shall be located at the base of the monitor. The valve shall be easily accessible and shall provide a means of controlling water flow to the monitor. The manual valve shall be actuated by a hand wheel gear.

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 in the aerial platform. Each station shall have the capability of controlling the nozzle pattern as well as the horizontal and vertical position of the device.

1-1/2" PLATFORM PRE-CONNECT

One (1) 1-1/2" NH pre-connect shall be located in the rear floor of the platform. The pre-connect shall be gated at the outlet with a quarter turn valve. A tread plate box shall be provided to hold up to 10' of 1-3/4" hose with a nozzle attached.

A 2-1/2" discharge is required per NFPA, current edition. Selecting this option without a 2-1/2" discharge(s) at the tip will require a signed SOE.

2-1/2" PLATFORM DISCHARGE

One (1) 2-1/2" discharge shall be located at the front of the platform. The discharge shall be controlled at the platform by a quarter-turn ball valve.

Shop Note: Be sure the 2-1/2" discharge is plumbed so it is outside of the ladder when the ladder is placed on the parapet ladder mount

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

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 aerial 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. When installed in the brackets, the roof ladder shall be retained with hold down brackets so that it will not come out of the brackets unexpectedly.

One (1) Duo-Safety, model 775-A, 14' aluminum roof ladder with folding roof hooks shall be provided.

FLY SECTION MOUNTED PIKE POLE

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

One (1) Fire Hooks Unlimited, model RH-10, 10' steel shaft pike pole with a New York Roof Hook and chisel end shall be provided.

CHASSIS PAINT

The single tone chassis cab shall be painted by the chassis manufacturer.

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 AkzoNobel 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 Akzo-Nobel 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 AkzoNobel High Solids Polyurethane Base Coat.

The single tone body shall be painted AkzoNobel red.

Shop Note: The non-metallic red paint code will be determined by the signing of the paint chips

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 AkzoNobel High Solids polyurethane enamel paint. The color shall be AkzoNobel white.

Shop Note: The non-metallic white paint code will be determined by the signing of the paint chips

The paint shall be a standard non-metallic Akzo-Nobel 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 PLATFORM PAINT COLOR

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

The aerial platform shall be painted with AkzoNobel High Solids polyurethane enamel paint. The color shall be AkzoNobel white. The front platform doors shall be unpainted anodized aluminum with a silver, brushed finish.

Shop Note: The non-metallic white paint code will be determined by the signing of the paint chips

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

PAINTED PLATFORM LEVELING CYLINDERS

The platform leveling cylinders shall be painted with Sikkens polyurethane enamel paint. The color must be stated in the shop note.

The color of the cylinders shall be a non-metallic color.

AERIAL LADDER SIGN PAINT COLOR

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

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 AkzoNobel paint formula printed on the reverse side.

RUB RAIL REFLECTIVE STRIPING

There shall be 2" reflective striping installed in the rub rail channel. The reflective striping shall be diamond grade quality material for increased visibility. The reflective shall be silver in color.

REFLECTIVE STRIPING - STABILIZER BEAMS

Retroreflective striping shall be installed on the front and rear sides of the four (4) 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 3983, 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 rear face of the body. The torque box door shall be excluded from the chevron reflective striping.

Shop Note: The unpainted stainless steel outrigger control doors and ground station doors will also be chevron

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 Electrical Two (2) Years or 36,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0202. 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.