

Antietam Fire Apparatus, Inc.

PROPOSAL

Antietam Fire Apparatus, Inc. is pleased to offer the proposed vehicle to meet the intent of the fire department specifications. KME Fire Apparatus is a leading manufacturer in custom and commercial fire fighting vehicles.

Questions or concerns pertaining to this proposal can answered by contacting the following KME representative:

Bill White
Antietam Fire Apparatus, Inc.
19932 Beaver Creek Road
Hagerstown, MD 21740

Phone: (301) 797-1410 (General office line)
(877) 378-2781 (Toll free)
Cell: (443) 336-6688

Fax: (301) 797-1412
e-mail: bwhite@antietamfireapparatus.com

KME FIRE APPARATUS HISTORY

Kovatch brings to the fire and specialty vehicle market over five decades of broad-based experience in vehicle manufacturing, sales and service. The company was founded in 1946 as a car and truck repair business in Nesquehoning, PA. Various automobile and truck franchises were eventually acquired and continue to this day.

In the mid 1960's, Kovatch won its first rebuild contract for the US military. By the 1970's, the company had a string of successful rebuild and new manufacture contracts for various branches of the Defense Department. To this day, Kovatch is still known as a premier supplier of specialty apparatus to the Federal government and is currently working on several contracts.

In the mid 1980's, Kovatch began a commercial fire apparatus division, now known as KME Fire Apparatus. By combining decades of specialty vehicle experience with acquisitions of other manufacturers, Kovatch offers unparalleled products and services. Today, Kovatch manufactures upward of 500 vehicles per year for municipal and private fire and rescue service providers as well as the government. Our apparatus can be found across the country and increasingly around the world.

The Kovatch headquarters complex consists of over one-half million square feet and is a totally integrated manufacturing facility for emergency and specialty vehicles. The facilities include state of the art fabrication, machining, welding, painting and finishing departments. We also have a technical manual publication department for our vast line of products. Our knowledgeable workforce, including marketing, engineering, and manufacturing personnel, work as a team to provide world-class quality. Other factory locations include Ontario, California, Roanoke, Virginia and New York (near Albany.)

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KME has a national distribution network in place for sales and service of fire apparatus, as well as an international representative. Service and warranty matters are handled through our network as well as our locations in Virginia, New York and California.

Quality is very important to Kovatch. There is an in-house Quality Assurance department that is monitored by the Defense Contract Management Command (DCMC). Kovatch also has UL inspectors on site. For out of house testing, we utilize the US Army's facility at Aberdeen Proving Ground as well as private testing agencies. We offer training at the factory or at the Ocean City Volunteer Fire Department premises.

KME offer a broad line of apparatus known worldwide for their quality and reliability. The line includes commercial fuel transport trucks, aircraft refuelers, snow plows, and fire apparatus consisting of pumpers, rescue trucks, rapid intervention vehicles, tankers, elliptical tankers, wildland units, and a full line of aerial devices.

GENERAL INFORMATION

The proposed apparatus will be constructed to withstand the severe and continuous use encountered during emergency fire fighting services. The apparatus shall be of the latest type, carefully designed and constructed with due consideration to the nature and distribution of the load to be sustained.

These specifications detail the proposal for general design criteria of cab and chassis components, aerial device (if applicable), fire pump and related components (if applicable), water tank (if applicable), fire body, electrical components, painting, and equipment.

All items of these proposal specifications will conform to the National Fire Protection Association Pamphlet No. 1901, latest edition.

KME will furnish satisfactory evidence of our ability to construct, supply service parts and technical assistance for the apparatus specified.

FIRE APPARATUS DOCUMENTATION

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

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
- Front tire size and total rated capacity in pounds
- Rear tire size and total rated capacity in pounds
- Chassis weight distribution in pounds with water and manufacturer mounted equipment,

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- front and rear
- Engine make, model, serial number, rated horsepower, rated speed and governed speed
- Type of fuels and fuel tank capacity
- Electrical system voltage and alternator output in amps.
- Battery make, model and total capacity in cold crank amps (CCA)
- Transmission make, model and serial number. If so equipped chassis transmission PTO(s) make, model and gear ratio
- Pump make, model, rated capacity in gallons per minute (liters per minute where applicable) and serial number
- Pump transmission make, model, serial number and gear ratio
- Water tank certified capacity in gallons or liters
- Paint manufacturer and paint number(s)

Certification of slip resistance of all stepping, standing and walking surfaces.

The pump manufacturer's certification of suction capability.

A copy of the apparatus manufacturer's approval for stationary pumping applications.

The engine manufacturers certified brake horsepower curve for the engine furnished, showing the maximum governed speed.

The pump manufacturers certification of hydrostatic test.

The Underwriters Laboratory certification of inspection and test for the fire pump.

The certification of the test for the fixed power source.

Weight documents from certified scale - showing actual loading on the front axle, rear axle(s) and overall vehicle (with the water tank full but without personnel, equipment and hose) will be supplied with the complete vehicle to determine compliance with NFPA-1901.

Written load analysis and results of electrical performance tests.

The certification of water tank capacity.

The proposed chassis will be certified by KME as conforming to all applicable federal motor vehicle safety standards (FMVSS) in effect at the date of contract. This will be attested to by the attachment of a FMVSS certify caution label on the vehicle by KME, who will be recognized as the responsible final manufacturer.

KME will be responsible for preparing and maintaining a record file of parts and assemblies used to manufacture the proposed apparatus. These records will be maintained in KME's factory for a minimum of twenty (20) years. The file will contain copies of any and all reported deficiencies, all replacement parts required to maintain the apparatus, and original purchase documents including specifications, contract,

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invoices, incomplete chassis certificates, quality control reports and final delivery acceptance documents, the purchaser will have access to any and all documents contained in this file upon request.

"TOP OF THE LINE" CHASSIS

KME is proposing a custom built chassis, which is "Top Of The Line" including the cab structure and design, Multiplex electrical system, drive train and frame assembly.

GENERAL CONSTRUCTION

The proposed apparatus, assemblies, subassemblies, component parts, etc., will be designed and constructed with the due consideration to the nature and distribution of the load to be sustained and to the general character of the service to which the apparatus is to subjected when placed in service. All parts of the apparatus will be designed with a factor of safety, which is equal to or greater than that which is considered standard and acceptable for this class of equipment in fire fighting service. All parts of the proposed apparatus will be strong enough to withstand general service under full load. The apparatus will be so designed that the various parts and readily accessible for lubrication, inspection, adjustment and repair.

The apparatus will be designed and constructed, and the equipment so mounted, with due consideration to distribution of the load between front and rear axles that all specified equipment, including a full complement of specified ground ladders, full water tank, loose equipment, and firefighters will be carried without overloading or injuring the apparatus.

The aerial ladder will be designed as a modular component of the apparatus. The aerial ladder, its support structure, and outrigger system will be designed to comprise an integrated assembly, removable from the carrier vehicle as a single self-supporting unit. The design will facilitate repair, modifications or replacement of the aerial device, apparatus body, or chassis individually, as required by wear from use, obsolescence, or for purposes of refurbishment.

SINGLE-LINE RESPONSIBILITY

KME is providing single source manufacturing. KME designs, manufactures and builds our own fire apparatus cab, chassis, body and aerial device. This capability provides a consistent design and manufacturing procedures that will reduce warranty issues and provide ease in parts replacement.

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PRODUCT LIABILITY INSURANCE

KME is providing liability and facility insurance equaling \$25,000,000.00, which is one of the highest available in the fire industry. Reference attached documentation.

SERVICE CENTER AND PARTS DEPOT

The proposed KME Fire Apparatus vehicle is offered with service for in or out of warranty repairs can be promptly performed by the local KME authorized service center, 24 hours per day, 7 days per week and 365 days per year.

Service is provided by:

Antietam Fire Apparatus, Inc.
19932 Beaver Creek Rd.
Hagerstown, MD 21740
Ph: (301) 797-1410
Toll free: (877) 378-2781
Fax: (301) 797-1412

Cropper's, Inc.
10013 Old Ocean City Blvd.
Berlin, Md. 21811
Ph: (410) 641-1625

Service Center Capabilities

Antietam Fire Apparatus, Inc. celebrates its 18 th year of operation and employs ten (10) people and is proud to operate a Service Center in Hagerstown, MD. The privately owned operation employs four (4) full-time service mechanics to handle any service-related problems or improvements that you may desire.

Antietam Fire Apparatus, Inc. is a Hale Master Parts and Service Center that operates an on the road service truck that can offer In Station Service repairs to your apparatus if needed.

Antietam Fire Apparatus, Inc. offers twenty-four (24) hour service in which assigned service personnel carry pagers; one (1) man is always on call to handle any truck that is down and out of service.

The service facilities provide service to handle sheet metal repair and fabrication, pump and electrical repair, aerial ladder service, and effect booster tank enlarging and replacement, and minor or major refurbishment capabilities.

Service and repairs to all makes of fire apparatus including trucks with Hale, Waterous, Darley, FMC and John Bean Pumps.

The Service Center employees are fully insured with Workmans Compensation, at 3 Million Dollar Garage Keepers Liability Insurance Coverage and a 1 Million Dollar Products Liability Insurance Policy to protect your fire department in case of injury to personnel or your fire department equipment.

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PRICES AND PAYMENTS

The bid price will be F.O.B. Destination, on a delivered and accepted basis at the Fire Department.

Total price on KME's proposal sheet includes all items listed in these specifications.

KME will compute pricing less federal and state taxes.

DELIVERY TIME

KME is proposing to complete the apparatus delivery time based on the number of calendar days, starting from the date the sales contract is signed and accepted by KME Fire Apparatus.

Delivery Time: 240 Calendar Days

BOND REQUIREMENTS

An original bid bond has been submitted with the KME proposal. The bond will be for an amount equal to 10% of the proposed bid price.

KME's bonding company will meet the following requirements:

- An acceptable surety as outlined by the department of treasury on their most recent federal register at a limit of at least \$10,000,000;
- A.M. Best rating of "A" or better with a financial rating of at least "VIII"; and
- Licensed as a surety in the state where the sale is to be made.

PERFORMANCE BOND

A performance bond will be supplied by the KME upon acceptance of the signed sales contract for the apparatus. The performance bond will be for an amount equal to the full contract price (i.e. 100% bond).

MATERIAL AND WORKMANSHIP

All equipment furnished will be guaranteed to be new and of current manufacture, to meet all requirements of purchaser's specifications.

All workmanship will be of high quality and accomplished in a professional manner so as to insure a functional apparatus with a pleasing, aesthetic appearance.

SALES ENGINEER

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KME will designate an in house individual to perform the contractor's sales engineer functions. The sales engineer will provide a single point interface between the purchaser and KME on all matters concerning the contract.

APPROVAL DRAWING

A detailed drawing of the apparatus will be provided to the Ocean City Volunteer Fire Department for approval before construction begins. A copy of this drawing shall also be provided to the manufacturer's representative. Upon Ocean City Volunteer Fire Department approval, the finalized drawing shall become a part of the total contract.

The drawing shall show, but is not limited to, such items as the chassis make and model, major components, location of lights, sirens, all compartment locations and dimensions, special suctions, discharges, etc. The drawing shall be a visual interpretation of the apparatus as it is to be supplied.

KME shall also provide a pump panel drawing for Committee approval as specified.

INSPECTION VISITS

KME will provide three (3) factory inspection trips to KME's facility. Transportation, meals, lodging, and other requisite expenses will be the bidder's responsibility.

Accommodations shall be for four (4) Fire Department representatives per trip.

The factory visits shall occur at the following stages of production of the apparatus:

- Pre-construction / blueprint review.
- Mid point completion of entire apparatus.
- Final inspection upon completion.

Travel arrangements less than 300 miles from the manufacturing facility shall be via ground transportation.

The customer maintains the right to inspect the apparatus, within KME's normal business hours. At any other point during construction expenses incurred during non-specified visits shall be the responsibility of the customer.

During inspection visits, the customer reserves the right to conduct actual performance tests to evaluate completed portions of the unit. Testing shall be accomplished with the assistance and resources of the contractor.

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DELIVERY

Delivery of the apparatus to the Fire Department will remain KME's responsibility.

A qualified and responsible representative of KME will deliver the apparatus to the Fire Department and remain on location for a minimum of two (2) days for training, etc.

INSTRUCTION MANUALS/DRAWINGS, SCHEMATIC

KME will supply at time of delivery, two (2) copies (printed and electronic formatted) of a complete operation and service manual covering the complete apparatus as delivered and accepted.

The manual will contain the following:

- Descriptions, specifications, and ratings of chassis and fire pump .
- Wiring diagrams
- Lubrication charts
- Operating instructions for the chassis, any major components such as a pump and any auxiliary systems.
- Instructions regarding the frequency and procedures recommended for maintenance.
- Parts replacement information.

"AS BUILT" WIRING SCHEMATICS

In accordance with standard commercial practices, KME will supply two (2) copies of "AS BUILT" wiring schematics/diagrams for the entire vehicle at the time of delivery.

VEHICLE FLUIDS PLATE

As required by NFPA-1901, KME will affix a permanent plate in the driver's compartment specifying the quantity and type of the following fluids used in the vehicle:

- Engine oil
- Engine coolant
- Chassis transmission fluid
- Pump transmission lubrication fluid
- Drive axle(s) lubrication fluid
- Air-conditioning refrigerant
- Air-conditioning lubrication oil
- Power steering fluid

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- Cab tilt mechanism
- Transfer case fluid
- Equipment rack fluid
- Air compressor system lubricant
- Generator system lubricant

PRINCIPLE APPARATUS DIMENSIONS & G.V.W.R.

The principle dimensions of the completed apparatus will not exceed the following maximum acceptable dimensions:

KME's PROPOSED DIMENSIONS:

- OVERALL LENGTH: 367"
- OVERALL WIDTH: 100" (not including mirrors)
- OVERALL HEIGHT: 116"
- WHEELBASE: 186"

The axle and total weight ratings of the completed apparatus will not be less than the following minimum acceptable weight ratings:

- MINIMUM FRONT G.A.W.R.: 22,500 lbs.
- MINIMUM REAR G.A.W.R.: 27,000 lbs.
- MINIMUM TOTAL G.V.W.R.: 49,500 lbs.

KME will include the principle dimensions, front G.A.W.R., rear G.A.W.R., and total G.V.W.R. of the proposed apparatus. Additionally, KME will provide a weight distribution of the fully loaded, completed vehicle; this will include a filled water tank, specified hose load, miscellaneous equipment allowance in accordance with NFPA-1901 requirements, and an equivalent personnel load of 200 lbs. per seating position.

PROPOSAL BLUEPRINT

KME is providing a scaled drawing of the specific apparatus being proposed WITH THE BID. The drawing has been generated by KME's engineering department in order to maintain the accuracy of the drawing.

FAMA MEMBERSHIP

KME Fire Apparatus is a leading and proud member of the Fire Apparatus Manufacturer's Association (FAMA).

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U.S.A. MANUFACTURER

The entire apparatus shall be assembled within the borders of the Continental United States to insure more readily available parts (without added costs and delays caused by tariffs and customs) and service.

QUALITY MANAGEMENT

KME Fire Apparatus operates a Quality Management System under the requirements of MIL-I-45208A, a military specification for a quality inspection system established to substantiate product conformance to drawings, specifications, and contract requirements. A copy of the certificate of compliance has been included in the bid.

TABLE OF CONTENTS

To provide for ease of bid comparison and to clearly locate all proposed items, KME has generated a Table of Contents that is provided at the beginning of the proposed bid specifications.

STEPPING, STANDING, & WALKING SURFACES

All stepping, standing, and walking surfaces on the body will meet NFPA #1901 anti-slip standards. Aluminum tread plate utilized for stepping, standing, and walking surfaces will be Alcoa No-Slip type. This material will be certified to meet the NFPA #1901 standard. Upon request by the purchaser, KME will supply proof of compliance with this requirement. All vertical surfaces on the body, which incorporate aluminum tread plate material, will utilize the same material pattern to provide a consistent overall appearance.

UNDERWRITERS LABORATORIES INC. (UL) EXAMINATION AND TEST PROPOSAL FOR AUTOMOTIVE FIRE APPARATUS

GENERAL

The proposed unit will be tested and certified for KME Fire Apparatus by Underwriters Laboratories Inc. (UL) Underwriters Laboratories Inc. (UL) is recognized worldwide as a leading third party product safety certification organization for over 100 years. UL has served on National Fire Protection Association (NFPA) technical committees for over thirty years.

INDEPENDENT TESTING ORGANIZATION QUALIFICATIONS

- UL is a nationally recognized testing laboratory recognized by OSHA.
- UL complies with the American Society for Testing and Materials (ASTM) Standard ASTM E543

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"Determining the Qualifications for Nondestructive Testing Agencies."

- UL has more than 40 years of automotive fire apparatus safety testing experience and 16 years of factory aerial device testing and Certification experience. UL has more than 100 years of experience developing and implementing product safety standards.
- UL does not represent, is not associated with, nor is in the manufacture or repair of automotive fire apparatus.
- All test work for fire pumps outlined in NFPA 1901, Edition will be conducted.
- UL has included a list of all factory aerial device manufacturers for whom testing is currently being conducted on a regular basis.
- UL carries ten million dollars in excess liability insurance for bodily injury and property damage combined.

All work outlined in NFPA 1914, current Edition, including nondestructive testing, will be conducted at the manufacturer's facility.

PERSONNEL

The UL inspectors performing the test work on the units are certified to Level II in the required NDT methods, under the requirements outlined in ASNT document CP-189.

The actual person(s) performing the inspection will present for review proof of Level II Certification in the required NDT methods.

Prior to submittal to the automotive fire apparatus manufacturer, the final Report will be reviewed by the Supervisor of Fire Equipment Services and a Registered Professional Engineer, both of whom are directly involved with the aerial device certification program at UL.

CERTIFICATION

When the unit successfully meets all the requirements outlined in NFPA 1901, 2003 Edition, UL will issue a Certificate of Automotive Fire Apparatus Examination and Test stating the units compliance with NFPA-1901.

LINE VOLTAGE ELECTRICAL SYSTEM CERTIFICATION

When the unit successfully meets all the requirements outlined in NFPA 1901, 2003 Edition, UL will issue a Certificate of Automotive Fire Apparatus Examination and Test stating the unit's compliance with the required line voltage section of NFPA.

FOAM PROPORTIONING SYSTEM CERTIFICATION

When the unit successfully meets all the requirements outlined in NFPA 1901, 2003 Edition, UL

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will issue a Certificate of Automotive Fire Apparatus Examination and Test stating the unit's compliance with the required foam proportioning section of NFPA.

GENERAL APPARATUS DESCRIPTION "PUMPER"

The unit shall be designed to conform fully to the "Pumper Fire Apparatus" requirements as stated in the NFPA 1901 Standard (2003 Revision), which shall include the following required chapters as stated in this revision:

- Chapter 1 Administration
- Chapter 2 Referenced Publications
- Chapter 3 Definitions
- Chapter 4 General Requirements
- Chapter 5 Pumper Fire Apparatus
- Chapter 12 Chassis and Vehicle Components
- Chapter 13 Low Voltage Electrical Systems and Warning Systems
- Chapter 14 Driving and Crew Areas
- Chapter 15 Body, Compartments and Equipment Mounting
- Chapter 16 Fire Pumps and Associated Equipment
- Chapter 19 Water Tanks
- Chapter 21 Foam Proportioning Systems
- Chapter 23 Line Voltage Systems

CAB SAFETY SIGNS

The following safety signs shall be provided in the cab:

- A label displaying the maximum number of personnel the vehicle is designed to carry shall be visible to the driver.
- "Occupants must be seated and belted when apparatus is in motion" signs shall be visible from each seat.
- "Do Not Move Apparatus When Light Is On" sign adjacent to the warning light indicating a hazard if the apparatus is moved (as described in subsequent section).
- A label displaying the height, length, and GVWR of the vehicle shall be visible to driver. This label shall indicate that the fire department must revise the dimension if vehicle height changes while vehicle is in service.

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CHASSIS DATA LABELS

The following information shall be on labels affixed to the vehicle:

Fluid Data:

- Engine Oil
- Engine Coolant
- Chassis Transmission Fluid
- Pump Transmission Lubrication Fluid
- Drive Axle(s) Lubrication Fluid
- Air Conditioning Refrigerant
- Air Conditioning Lubrication Oil
- Power Steering Fluid
- Cab Tilt Mechanism Fluid
- Transfer Case Fluid
- Air Compressor System Lubricant
- Generator System Lubricant
- Front tire cold pressure
- Rear tire cold pressure

Chassis Data:

- Chassis Manufacturer
- Production Number
- Year Built
- Month Manufactured
- Vehicle Identification Number

Manufacturers weight certification:

- Gross Vehicle (or Combination) Weight Rating (GVWR or GCWR)
- Gross Axle Weight Rating, Front
- Gross Axle Weight Rating, Rear

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"PREDATOR" CAB TYPE

- FULL TILT
- CONTOUR WINDSHIELD

The cab shall be a custom tilt style, built specifically for fire service. The cab shall be a cab over engine design, with integral tilt mechanism and engine access from inside the cab.

Cab shall be designed, fabricated, assembled in its entirety, and installed on the frame rails in the factory of the bidder. This requirement shall eliminate any split responsibility in warranty and service. NO EXCEPTIONS TO THIS REQUIREMENT.

OPEN SPACE DESIGN

The cab interior shall be the "Open-Space" design with no wall or window between the front and rear crew area to allow direct communication, better visibility and air circulation in the cab.

CAB MATERIAL

The cab shall be fabricated from 5052-H 32 aluminum alloy, utilizing the minimum material thickness as follows:

- | | |
|--------------------------------|----------------------|
| • Cab side panels | 0.125 thick (1/8") |
| • Cab roof | 0.125 thick (1/8") |
| • Forward cab front sheet | 0.125 thick (1/8") |
| • Interior cab panels | 0.125 thick (1/8") |
| • Other panels | 0.125 thick (1/8") |
| • Cab doors | 0.1875 thick (3/16") |
| • Engine enclosure side panels | 0.250 thick (1/4") |

CAB - BASE CONSTRUCTION

Cab sub-frame shall be a welded assembly fabricated of 6063 structural aluminum alloy. This frame shall extend the full length and width of the cab and be secured to the chassis frame through two (2) rear urethane self centering load cushions, two (2) forward pivot brackets, and two (2) cab locks. The cab shall be of entirely welded construction.

The front cab wall shall be of double wall type construction, featuring an inner and outer panel. (No Exceptions)

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CRASH TESTING CERTIFICATION

To ensure the safety of the cab occupants and cab integrity, proof of third party testing shall be provided. The cab shall be certified for SAEJ2422 side impact, SAEJ2420 with ECER29 cab front impact, and ECER29 cab roof strength. NO EXCEPTIONS

DIMENSIONS - LONG FOUR DOOR STYLE CAB

Minimum Cab Dimensions:

- Overall width 96"
- Inside width across ceiling 88"
- Front area floor to ceiling 63"
- Top of front seat to ceiling 44" (depending upon seat type)
- Seat back to steering wheel 22" (depending upon seat type)
- Inside width (door to engine enclosure) 25" (driver's side, at floor)
- Inside width (door to engine enclosure) 22-1/2" (officer's side, at floor)
- Crew seat area width 88"
- Outer crew seat risers to rear wall 49-1/2"
- Centerline axle to rear wall 67-1/2"
- Centerline axle to front of cab 74"
- Floor to top of engine enclosure 31-1/2"

Glass Area Dimensions:

- Windshield (Contour) 2,900 sq. in.
- Front door window, retractable 743 sq. in. each
- Rear door window, retractable 875 sq. in. each
- Side fixed crew windows 620 sq. in. each

Cab Entry Door Dimensions

- Forward door opening 73" high x 37" wide
- Forward door recessed step 30" wide by 8-1/2" deep
- Rear door opening 89-3/4" high x 31" wide
- Rear door recessed step 20" wide x 8-1/2" deep

CAB ROOF

The roof shall be of a split level design with radius edges for a pleasing, streamline appearance. The roof shall be ribbed internally for maximum stiffness.

The cab roof over the rear crew area shall be raised sixteen (16) inches higher than the front driver

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and officer area. The front face of the raised roof section shall be sloped at a 45 degree angle, creating a streamlined interface with the standard, lower, forward roof section. This design shall allow for additional interior height in the rear crew area.

The rear crew area doors shall be "Vista-Style", extending full height to the radius edge of the raised roof.

Approximate dimensions:

- Crew area floor to ceiling 69-1/2"
- Top of crew seat to ceiling 51" (depending upon seat type)

CAB ROOF OVERLAY

A bright finish aluminum tread plate overlay shall be placed on the cab roof, starting at a point rearward of the light bar location and extending back to the end of the cab roof. This tread plate overlay shall be sealed with caulking around the edges to prevent moisture from entering the area between the cab roof and the overlay.

CAB ROOF DRIP RAIL

For enhanced protection from inclement weather, a drip rail shall be furnished on the sides of the cab. The drip rail shall be constructed of bright polished extruded aluminum, and be fastened to the sides of the cab roof edge. The drip rail shall extend the full length of the cab roof.

BARRIER HEIGHT CAB DOORS

Four (4) side-opening doors shall be provided. The cab doors shall be shortened to the floorboard level, thus leaving an exposed step well area at each cab entrance. The cab doors shall be totally aluminum construction with an extruded aluminum frame and a 3/16" thick aluminum outer door skin.

The forward cab door opening shall be a minimum of 37" wide, and the rear cab door opening shall be a minimum of 31" wide. The rearward cab doors shall have a radius cutout allowing the door opening to protrude forward over the cab wheel well, while providing full access to the rear crew area.

There shall be a heavy duty piano type stainless steel hinge on each door of a minimum pin diameter of 5/16" . Hinges shall be slotted for ease of horizontal and vertical adjustment. There shall be a cab door seal and the doors shall close flush with the side of the cab. A heavy-duty 6" wide belting material shall be utilized to prevent the cab doors from opening greater than 90 degrees.

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CAST OPEN GRATE STEPS

The front entrance steps shall be a minimum of 29" wide x 8-1/2" deep. Each step shall be a cast aluminum, open grate style step fabricated by Cast Products Inc. with a polished aluminum outer surface. The cab step risers shall be overlaid with 1/8" polished aluminum tread plate.

The rear entrance steps shall be a minimum of 22 3/4" wide x 9" deep. Each step shall be a cast aluminum, open grate style step fabricated by Cast Products Inc. with a polished aluminum outer surface. The cab step risers shall be overlaid with 1/8" polished aluminum tread plate.

ENTRY STEP AREA

Each of the forward entrance steps shall be a minimum of 8-1/2" deep x 30" wide with the floor board recessed a minimum of 3" to avoid "shin knocking". Each step shall be fabricated as an integral part of the cab construction. The cab step and risers shall be overlaid with bright finish aluminum tread plate.

Each of the rear entrance steps shall be a minimum of 8-1/2" deep x 20" wide. An intermediate step shall be provided between the lower entrance step and the crew area floor for ease of entry and egress. Each set of steps and respective step risers shall be constructed as an integral part of the cab construction and shall be overlaid with bright finish aluminum tread plate.

DOOR LATCHES

Heavy-duty, bright finish cast paddle latches shall be provided on the interior and exterior of each cab door. Door latch mechanisms which utilize spring steel clamps shall not be considered due to their tendency to both rust and break. The interior door latch cables are to be designed to reduce adjustment or possible wear at the adjustment turnbuckles.

Each exterior cab door shall be equipped with keyed locks. The cab doors shall be capable of being locked from the outside with a key and from the inside with a push-pull control installed in each door.

ELECTRIC WINDOWS

Each side cab door shall have a tinted retractable window, The window track shall be designed into the door frame extrusion, which shall be extruded with a track groove to house a window track and seal. The window shall be capable of being removed from an access slot designed in the bottom of the door frame.

All side cab doors shall be equipped with electrically operated windows.

The control for each door shall be a rocker type automotive style switch located on the inside door panel within easy reach.

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The driver shall also have a control to operate the passenger's side window and the rear cab doors, a single control shall be located on the driver's lower instrument panel.

INNER DOOR PANELS

The upper section of each cab door interior shall have a formed ABS door panel, which shall be vacuum overlaid with a soft vinyl upholstery material. The color of the panel upholstery shall be gray. The ABS door panels shall terminate approximately ten (10) inches above the cab floor.

DOOR SCUFF PLATES

The lower and full width portion of each door interior shall have smooth brushed finished aluminum scuff plates to provide maximum wear protection. These plates shall extend above the inside cab floor level when the doors are closed.

Each interior cab door panel shall be equipped with reflective ScotchLite material that shall cover at least 96 in².

DOOR JAMB SCUFF PLATES

Each cab door jamb shall be equipped with a polished stainless steel scuff plates to protect the cab paint when exiting and entering the cab. The scuff plate shall extend from the bottom of the door to the top of the door.

WINDSHIELD/GLASS

A one piece, symmetrical, safety glass windshield shall be provided on the cab for the driver and officer providing a clear viewing area. The windshields shall be full width to the center of the front cab support for each side and provide the occupants with a panoramic view. To provide enhanced peripheral vision on each side of the cab, the windshield and cab structure shall be designed with radius corners, which provide a minimum of 8" of glass area, measured from the glass face to the side edge near the door post. The windshield shall consist of three (3) layers; the outer light, the middle safety laminate and the inner light. The thick outer light layer shall provide superior chip resistance, the middle safety laminate layer shall prevent the windshield glass pieces from detaching in the event of breakage and the inner light shall provide yet another chip resistant layer.

The windshield will be a contour design with 2900 sq. in. of area for improved visibility and style. The windshield glass shall be designed so it can be used on either the driver or officer side. Windshields that are epoxied or bonded to the cab structure will not be acceptable!

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WINDSHIELD WIPERS AND WASHER

Dual, electric operated, pantographic type windshield wipers shall be provided. One (1) electric drive motor must be provided for each wiper. Windshield wiper systems which utilize a single motor and a reciprocating actuator arm shall not be considered.

Wipers shall have "HI/LO" and "INTERMITTENT" operating speeds. "HI/LO" speeds shall be controlled by a steering column control, within the turn signal control stem. "INTERMITTENT" operation shall be controlled by a twist switch within the control on the steering column. The wipers shall be of the self-parking type.

Windshield washers shall be electric operated wet-arm type with a 3/4 gallon washer fluid reservoir, mounted inside the engine enclosure and readily accessible through the engine hatch at the rear of the engine enclosure. The washer control shall be integral with the intermittent wiper control switch.

There shall be individual removable panels on the front face of the cab for access to the wiper motor assemblies.

The windows provided on each side of the cab behind the forward cab doors shall be deleted.

DARK TINTED REAR WINDOW GLASS

The windshield and the forward cab door glass shall be provided with standard DOT green automotive tint. The side cab windows to the rear of the front doors, the rear cab door windows and any rear viewing windows shall be equipped with a dark automotive tint. The use of stick on material shall not be acceptable!

GRAB HANDLES

Four (4) 1-1/4" diameter x 28" long, knurled, bright anodized aluminum handrails shall be provided, one (1) at each cab door entrance. Grab rail stanchions shall be chrome plated and offset when necessary to prevent "hand-pinching" when opening or closing the doors. Formed rubber gaskets shall be provided between each stanchion base and the cab surface.

INTERIOR GRAB RAILS

Four (4) vertically mounted 12" black cast aluminum "D" style entry assist handles shall be installed, one (1) on each side of the cab interior on the "A" post and one (1) on each side of the cab interior on the "C" post in the crew area to assist in entry and exiting of the cab.

Each front cab door shall be provided with one (1) horizontally mounted, 11" long, black cast aluminum "D" style entry assist handle on the interior door panel to assist in entry and exiting of the cab and for closing the door.

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Each rear cab door shall be provided with one (1) horizontally mounted, 11" long, black cast aluminum "D" style entry assist handle on the interior door panel to assist in entry and exiting of the cab and for closing the door. Each rear cab door shall also be provided with one (1) horizontally mounted, 30" long black cast aluminum "D" style assist handle, located approximately 8" above the bottom of the window opening.

AIR INTAKE/OUTLET

There shall be a front air intake with a minimum of 945 square inches of open area for maximum air flow to the charge air cooler and the radiator.

Two (2) air inlets/outlets with a minimum of 43.5 square inches per inlet shall be provided horizontally above the wheel well opening, one on each side of the cab. The design shall permit proper ducting of air through the engine compartment and cooling system. The left side inlet, used for the air intake to the air cleaner, shall be equipped with an ember separator for separating water and burning embers from the air intake system. This system shall be such that particles larger than .039 inches (1 mm) in diameter can not reach the air filter element.

The air intake and outlets shall be covered with polished stainless steel louvers, secured with polished cast aluminum housings.

WHEEL WELL LINERS - Stainless Steel

The front cab wheel wells shall be equipped with fully removable, bolt-in, 12 gauge stainless steel inner wheel well liners. The liners shall extend full depth into the truck frame. The completely washable wheel well liners shall be designed to protect the cab substructure, inner panels and other miscellaneous installed components from road salts, debris, dirt accumulation and corrosion. Fender liners, which are fixed or only partially removable shall not be considered.

FENDERETTE'S

The cab wheel well openings shall be trimmed with replaceable, bolt-in, molded black rubber fenderette's. The fenderette's shall be secured to the cab with stainless steel threaded fasteners along the internal perimeter of the wheel well. Rubber welting shall be installed between the fenderette's and the cab side panel.

MUD FLAPS

Heavy duty, black rubber type mud flaps shall be provided behind the front wheels.

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CAB MIRRORS

Each forward cab door shall have a 16" x 6-1/2", heated and motorized, stainless steel, West Coast type mirror mounted on a swing-away, bow type, stainless steel bracket. Each mirror shall be individually remote controlled from the driver's position. The mirror heating elements shall be controlled by a single dash mounted switch. Two (2) 6" diameter, stainless steel, convex spot mirrors shall also be provided, one (1) on each main mirror bracket.

EXTENDING CONVEX MIRROR

One (1) Velvac, 6" (minimum) convex mirror extending mirror shall be provided and installed right hand side of cab extending forward off of cab roof. Support brackets shall be made of stainless steel material.

INTERIOR CAB TRIM

The cab interior shall be constructed to create an ergonomically designed interior to be user friendly and functional for the driver and officer.

The forward overhead panel shall be covered with a one-piece custom formed ABS vinyl overlay, which shall have integrated windshield defroster/heat vents.

All ABS formed material panels, as well as all of the interior upholstery panels shall be medium gray in color. The upholstered cab overhead and side wall portions shall utilize gray Durawear upholstery with padding underneath to provide additional insulation.

The interior metal surfaces of the cab shall be finish painted with a textured gray paint.

REAR CAB WALL

The interior, rear crew area cab wall shall be covered with bright finish aluminum tread plate.

STORAGE COMPARTMENTS

There shall be a compartment provided under each front seat with a latched access door. The compartment shall measure 8-3/4"W x 7-7/8"D x 4-3/4"H.

BARYFOL FLOORING

The floor of the driver's compartment and the floor of the crew area shall be lined with BARYFOL vinyl composite flooring to comply with NFPA noise and heat requirements.

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The material utilized for this application shall be certified to meet the NFPA 1901, 2003 revision for anti slip walking surfaces. Manufacturer to supply proof of compliance for this item. (No Exceptions)

ENGINE ENCLOSURE

The forward portion of the engine enclosure shall be covered with a vinyl ABS material formed overlay to match the balance of the cab interior. To allow maximum "elbow room" for the driver and officer, the forward portion of the engine enclosure shall feature a contour shape. The engine enclosure shall not significantly obstruct the driver's vision in any direction. The enclosure shall be an integral part of the cab structure, which shall be constructed from .250 5052-H32 aluminum, providing adequate strength to support radio, map boxes, etc. The engine enclosure shall be insulated to protect from heat and sound. The noise insulation shall keep the DBA level within the limits stated in the current NFPA series 1900 pamphlet.

A padded, hinged access door shall be provided in the top rearward portion of the engine enclosure. The door shall allow access to the engine oil, transmission fluid, power steering fluid level dipsticks and the windshield washer fluid reservoir. The access door shall be provided with two (2) flush mounted latches and gas shock holders. There shall be a vinyl ABS material cover over the access door to give a cleaner look to the top of the engine enclosure and doghouse area.

ENGINE ENCLOSURE SCUFF PLATES & MOUNTING LOCATIONS

Brushed stainless steel scuff plates shall be provided on the surfaces of the engine enclosure. The location shall be as determined at the preconstruction conference next to the driver and officer and below the EMS compartments in the rear crew area. The scuff plates shall be located as per Fire Department instructions at the preconstruction conference.

DRIVER'S SEAT

The driver's seat shall be a H. O. Bostrom Sierra Air-50FX/HD air suspension, high back bucket seat. The seat shall have a tapered and padded seat cushion with lumbar support. The seat shall have a five inch fore and aft adjustment, a three inch height adjustment with heavy duty damper and a reclining seat back. The seat air ride suspension shall be pneumatically controlled from a control switch on the forward lower edge of the seat.

A red 3-point shoulder harness with lap belt shall be provided as standard equipment.

OFFICER'S SEAT

The officer's seat shall be a H. O. Bostrom Tanker 450 Air-50 series air-suspension, high back bucket seat. The seat shall have a tapered and padded seat cushion with lumbar support. The seat shall

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have a five inch fore and aft adjustment, a three inch height adjustment with heavy duty damper and a reclining seat back. The seat shall include a SCBA storage area with integral headrest. The seat air ride suspension shall be pneumatically controlled from a control switch on the forward lower edge of the seat.

A red 3-point shoulder harness with lap belt shall be provided as standard equipment.

The officer's seat shall include a H. O. BOSTROM Secure All™ SCBA Locking System. The bracket system shall be free of straps and clamps that may interfere with auxiliary equipment on SCBA units. The center guide fork shall keep the tank in-place for a safe and comfortable fit in seat cavity. Fire fighters shall simply push the SCBA unit against the pivot arm to engage the patented auto-locking system. Once the lock is engaged, the top clamp shall surround the top of the SCBA tank for a secure fit in all directions.

The standard release handle shall be integrated into the seat cushion for quick and easy release and shall eliminate the need for straps or pull cords to interfere with other SCBA equipment.

CREW AREA SEATING, LFD CAB **DRIVER'S SIDE REAR FACING CREW SEAT**

There shall not be a crew seat provided in the rear facing driver's side position to allow for mounting of compartments and/or other specified equipment.

OFFICER'S SIDE REAR FACING CREW SEAT

There shall not be a crew seat provided in the rear facing officer's side position to allow for mounting of compartments and/or other specified equipment.

DRIVER'S SIDE FORWARD FACING CREW SEAT

The driver's side outboard forward facing crew seat shall be an H. O. Bostrom Tanker 400CT series fixed high back bucket seat. The seat shall have a tapered and padded seat cushion with lumbar support. The seat shall include an SCBA storage area with integral headrest.

The seat shall be equipped with a red integrated 3-point shoulder harness with lap belt and an automatic retractor built into the seat assembly.

The driver's side outboard forward facing crew seat shall have a flip-up style seat base.

The driver's side forward facing outboard seat shall include a H. O. BOSTROM Secure All™ SCBA Locking System. The bracket system shall be free of straps and clamps that may interfere with auxiliary equipment on SCBA units. The center guide fork shall keep the tank in-place for a safe and comfortable fit in seat cavity. Fire fighters shall simply push the SCBA unit against the pivot arm to engage the patented auto-locking system. Once the lock is engaged, the top clamp shall surround the top of the SCBA tank for a secure fit in all directions.

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The standard release handle shall be integrated into the seat cushion for quick and easy release and shall eliminate the need for straps or pull cords to interfere with other SCBA equipment.

OFFICER'S SIDE FORWARD FACING CREW SEAT

The officer's side outboard forward facing crew seat shall be an H. O. Bostrom Tanker 400CT series fixed high back bucket seat. The seat shall have a tapered and padded seat cushion with lumbar support. The seat shall include an SCBA storage area with integral headrest.

The seat shall be equipped with a red integrated 3-point shoulder harness with lap belt and an automatic retractor built into the seat assembly.

The officer's side outboard forward facing crew seat shall have a flip-up style seat base.

The officer's side forward facing outboard seat shall include a H. O. BOSTROM Secure All™ SCBA Locking System. The bracket system shall be free of straps and clamps that may interfere with auxiliary equipment on SCBA units. The center guide fork shall keep the tank in-place for a safe and comfortable fit in seat cavity. Fire fighters shall simply push the SCBA unit against the pivot arm to engage the patented auto-locking system. Once the lock is engaged, the top clamp shall surround the top of the SCBA tank for a secure fit in all directions.

The standard release handle shall be integrated into the seat cushion for quick and easy release and shall eliminate the need for straps or pull cords to interfere with other SCBA equipment.

CENTER FORWARD FACING CREW SEATS

Two (2) center inboard forward facing crew seats shall be provided, each seat shall be an H. O. Bostrom Tanker 400CT series fixed high back bucket seat. Each seat shall have a tapered and padded seat cushion with lumbar support. Each seat shall include an SCBA storage area with integral headrest.

Each seat shall be equipped with a red integrated 3-point shoulder harness with lap belt and an automatic retractor built into the seat assembly.

The two (2) center inboard forward facing crew seats shall have a flip-up style seat bases.

The center forward facing seats shall include a H. O. BOSTROM Secure All™ SCBA Locking System. The bracket system shall be free of straps and clamps that may interfere with auxiliary equipment on SCBA units. The center guide fork shall keep the tank in-place for a safe and comfortable fit in seat cavity. Fire fighters shall simply push the SCBA unit against the pivot arm to engage the patented auto-locking system. Once the lock is engaged, the top clamp shall surround the top of the SCBA tank for a secure fit in all directions.

The standard release handle shall be integrated into the seat cushion for quick and easy release and shall eliminate the need for straps or pull cords to interfere with other SCBA equipment.

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SEAT UPHOLSTERY MATERIAL

The seats shall be upholstered with heavy duty gray Duracoat vinyl material as provided by Bostrom.

ADVANCED OCCUPANT RESTRAINT SYSTEM

The cab shall be equipped with advanced occupant restraint systems. This system shall function in the event of a side roll over and shall be compatible with occupants ranging from a 5th percentile female to 95th percentile male. This system consists of a roll sensor, seat and occupant pretensioner; buckle pretensioners and inflatable side airbags. This system shall be functionally active while the truck is in operation.

ROLL SENSOR

The roll sensor continually monitors the roll rate and angle of the vehicle, and deploys safety devices when a roll event occurs. Deployment determination is made by a combination of vehicle angle and angular rate. Vehicle deployment angle shall never exceed 60 degrees.

The roll sensor performs self-diagnostics each time the vehicle is started. A dash-mounted light shall turn off after approximately 10 seconds if the sensor is functioning. During operation, the roll sensor monitors for proper connection to each safety device in the vehicle once per second. If improper connection is measured at any device or if an internal fault occurs, the roll sensor shall illuminate the dash-mounted light. The system shall continue to function in the event of non-critical faults. System diagnostics are on the SAE J 1587 bus.

DRIVER'S POSITION

If the Driver's position is equipped with a suspension seat, in addition to the 3-point seat belt, an occupant and seat pre tensioning system and an inflatable side airbag shall be used.

In the event a non-suspension seat is used in the Driver's position, a buckle-pre tensioning device shall be used in conjunction with an inflatable side airbag. The seat and occupant pre tensioning system should function and position the occupant prior to the side airbag deployment.

OFFICER'S POSITION

In addition to the 3-point seat belt, the Officer's position shall be equipped with a buckle pre tensioning device and inflatable side airbag. A hybrid or pyrotechnic inflator shall inflate the side airbags. The bag should remain inflated to the extent of providing head cushioning for 10 seconds after inflation. Pretensioners should be compatible with either ABTS or body mounted seats and seat belts. Buckle

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pretensioners shall be used on static or power seats where there is no air suspension. The buckle pretensioners must be capable of stroking 125 mm.

MID POSITIONS

In addition to the 3-point seat belt, the mid-row positions shall be equipped with a buckle pretensioning device and inflatable Side Airbag. A hybrid or pyrotechnic inflator shall inflate the side airbags. The bag should remain inflated to the extent of providing head cushioning for 10 seconds after inflation. Pretensioners should be compatible with either ABTS or body mounted seats and seat belts. Buckle pretensioners shall be used on static or power seats where there is no air suspension. The buckle pretensioners must be capable of stroking 125 mm.

HIGH RISE PACK STORAGE AREA

An area under the four (4) forward facing rear crew seats shall be provided for storage of a high rise hose pack. The hose pack shall be accessible from either side of the apparatus and shall be provided with sufficient restraints for NFPA compliance.

SUN VISORS

To provide maximum protection for the driver and officer, two (2) padded sun visors measuring 19"L x 7-1/2"W, with shock retainers, shall be recess mounted in the cab overhead on each side.

INTERIOR CAB STORAGE COMPARTMENTS

A dual storage compartment shall be mounted in the cab in lieu of rearward facing crew seats. Each compartment shall be approximately 46" high x 24" wide x 24 deep. Each door opening shall be approximately 41 7/8 " high x 21" wide. Each compartment shall be constructed of smooth aluminum and shall be equipped with a roll-up door.

The compartments shall be constructed of aluminum and the exposed area of the compartments inside the cab, will be painted to match the interior surface color of the cab. The compartments shall be equipped with roll-up doors.

The EMS compartments shall be equipped with one (1) Amdor brand LED interior lights. The lighting shall be wired to automatically activate when the compartment door is open and the master battery switch is in the "on" position.

MAP BOOK STORAGE

A map book compartment shall be provided for horizontal storage of three (3) 2" 3-ring binders,

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which shall be front loaded. The storage compartment shall be constructed from 1/8" aluminum, which shall be painted with textured paint, matching the interior color of the cab.

ANTENNA INSTALLATION

Two (2) antenna mounting base(s) Model #MATM with 17' of coaxial cable shall be provided as specified and installed on the lower cab roof, behind the light bar, **one (1) for cell phone and the other for Fire Department radio use.** The attached antenna wire(s) shall be run to the right side cab dash area.

CONDUIT FOR RADIO WIRING

A section of 1-1/4" ID flex conduit shall be provided from the area under the dash of the officer's side of cab to the pump operator's panel.

KME shall install a customer furnished radio harness between the cab and the pump panel as specified.

DASH & CENTER CONSOLE

The dash shall be constructed of a vinyl overlaid, ABS custom formed material to create an ergonomically designed interior to be user friendly and functional for the driver and officer. The instrument cluster shall be centered in front of the driver and all gauges shall be fitted in a non-glare pewter panel.

All warning lights and indicators shall be located in either the gauge itself or in the warning light cluster located in the lower center portion of the dash. Each gauge shall be equipped with an international symbol that is easily recognizable, denoting the system being monitored. Instrumentation shall be backlit for easy identification.

The transmission gear selector and the spring brake control valve shall be located on the left side of the center dash assembly, toward the driver for easy access.

There shall be provisions for mounting a switch panel in the center of the dash between the driver and officer. The top center of the dash assembly shall contain one (1) large removable access door for access to the main chassis wiring panels and breaker panels.

LOWER RIGHT AUXILIARY SWITCH PANEL

The driver's lower right panel shall contain four (4) multi-function, multiplexed switches. One switch shall be utilized for panel dimming, one switch shall control the fast idle, one switch shall control the head lights and the last switch shall select either the air horn or electric horn. These switches shall be clearly labeled with integral LED indicators.

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The lower portion of this panel can be used for the installation of up to five (5) guarded type rocker switches. Examples of the switches that shall be installed in this area are automatic chains, fan clutch over-ride, ATC mud-snow, inter-axle diff lock, electric fuel pump, all wheel drive, etc.

DRIVERS DASHBOARD PANEL

The main instrument panel shall be centered in front of the driver and shall be hinged at the bottom with two ¼ turn latches at the top. The dash panel shall be 1/8" aluminum with an anti-glare, pewter finish brushed surface. The drivers dashboard panel shall contain the gauge panel along with an instrument warning light cluster.

The main instrument panel shall contain ten (10) primary gauges. An ignition and engine start switch shall be located on a panel to the left upper portion of the driver's side dash panel.

Each gauge shall have a raised glass lens with polished chrome trim ring and be backlit by integral blue LED's. Each gauge shall be designed with an integral red warning light with a pre-programmed warning point. Gauges monitoring drive-train component status shall be of the direct data bus type capable of displaying information broadcast on the J 1939 data-link. Each gauge warning indicator shall be capable of activating an audible alarm inside the dashboard.

The ten (10) primary gauges shall consist of:

- Vehicle speedometer (0-80 mph) with digital odometer
- Engine tachometer (0-3000 rpm) with digital hour meter
- Engine oil pressure (0-100 psi); low oil pressure warning
- Engine coolant temperature (100-280 °F); high engine temp warning
- Transmission oil temperature (100-350 °F); high transmission fluid temp warning
- Vehicle battery voltage (9-18 VDC); low voltage warning at
- Front air system gauge (0-150 psi); low air pressure warning at 65 psi
- Rear air system gauge (0-150 psi); low air pressure warning at 65 psi
- Fuel level (E-1/2-F); low fuel level warning
- Air cleaner restriction gauge (0 - 40), warning at 25"
- Engine Compression Brake Controls
- Class One "Officer's Speedometer" (near officer's seating position)

Additional auxiliary control switches and instruments (if applicable) shall be located within the center or overhead panel located near the driver's position.

A display shall be provided on the dash for the electrical ES-Key multiplex system. The exact location shall be determined by the totality of instruments and switches on the cab dash. The display shall be in easy reach of the officer to view information.

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INDICATOR CLUSTER

The driver's dashboard panel shall consist of Ametek gauges, an 18 item instrument warning light cluster and a 16 item, dead front type alarm panel.

This display shall contain the system control unit that collects data from the vehicle data bus (J1939), analog sensors, and switches throughout the vehicle. This data shall be presented using gauges, telltales and the two (2) display panels. The warning light display shall include a 2 x 20 dot matrix display, 18 telltales and 2 buttons to navigate through the screen menus.

The LCD dot matrix display shall be a 2 line by 20-character display with each character being 7 dot by 5 dot configuration. FSTN technology shall be used on the display for wide viewing capability. The module shall be backlit with amber LED's. The unit shall also be supplied with a heater to ensure proper operation over the entire 40 to +85 deg. C.

This display contains a series of two (2) screens to provide information about the vehicle. To control the display of that information, the screens are divided into two (2) menus; one that can be displayed while the vehicle is in motion and one that can only be accessed when the parking brake is set.

On the Road displays include:

- Two (2) configurable displays that can show any of the parameters the unit collects. This includes odometer, trip information, fuel economy information; all gauge data, and virtually any other data available on the vehicle that the display has access to, either through the data bus or via analog inputs.
- Two (2) trip displays for miles and hours that are capable of being reset.
- Two (2) fuel data screens shall be provided; one for fuel remaining until empty and one for fuel economy. The fuel economy display shall be capable of being reset so that average economy over a predetermined period can be displayed.

The displays that can be accessed when the parking brake is set include:

- Engine hours as maintained by the engine ECU
- Service Alarm screens to report miles to next service or miles past required service. These screens shall allow the operator to choose the length of the service interval and shall have the ability to reset it.
- Message screens with warning messages the display has collected during the current ignition cycle. These screens shall be divided into configured warnings such as "Low Air Pressure" and the data bus faults reported by ECU's on the vehicle. Both lists shall allow the operator to review the last 12 events that occurred on the vehicle for maintenance and troubleshooting purposes.
- Diagnostic screens shall test the instrumentation system to verify it is working correctly.
- Setup screens shall be used to select either English or metric display. They shall also allow the operator to choose the data that shall be displayed by the configurable on-the-road screens.

The system shall be configured with user defined warning messages such as Low Air Pressure or High Coolant Temperature. When these events occur the warning message shall come up on the screen

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and can be accompanied by a buzzer. The messages shall be prioritized so the most important messages are always displayed. Whether the message can be dismissed by pressing a button shall be configurable. Messages that have been dismissed but are still active shall be retained in the message screens for review until the ignition is turned off. Listed below are the defined telltales and their indicators.

- "Right And Left Directional" arrows (green in color)
- "Ignition ON" Indicator (amber in color)
- "Hi Beam" indicator (blue in color)
- "Battery ON" indicator (green in color)
- "Parking Brake ON" indicator (red in color)
- "Check Transmission" indicator (amber in color)
- "Cab Not Latched" indicator (red in color)
- "Stop Engine" indicator (red in color)
- "Check Engine" indicator (amber in color)
- "ABS Warning" indicator (red in color)
- "Low Coolant Level" (red in color)
- "Fuel Restriction" indicator (amber in color)
- "Water In Fuel" indicator (amber in color)
- "Fasten Seat Belts" indicator (red in color)
- ---"Fast Idle" Indicator (amber in color)
- "Do Not Move Truck" indicator (red in color)
- "Exhaust High Temperature" (amber in color)
- "Engine Diagnostic Fault" (amber in color)

Listed below are indicators that may be included, depending upon the vehicle configuration:

- "Wait To Start" indicator (amber in color)
- "Exhaust System Fault" (amber in color)
- "Topps System Fault" (amber in color)
- "Lube System Active" (amber in color)
- "Jacks Not Stowed" (red in color)
- "PTO Engaged" (green in color)
- "Inter Axle Lock" (amber in color)
- "4x4" (green in color)
- "Driver Controlled Diff Lock" (green in color)
- "Ok to Pump" (green in color)
- "Auto Traction Control" (amber in color)
- "Retarder Active" (amber in color)
- "Auxiliary Brake Active" (amber in color)
- "Low Engine Coolant" indicator light and alarm

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PUMP SHIFT CONTROL

The pump shift control and pump engaged indicator light shall be mounted in the driver's lower left panel. This control shall be equipped with a mechanical type lock to prevent inadvertent activation or de-activation. The lever positions and indicator light shall be clearly marked.

MOBILE TERMINAL AREA

There shall be a flat surface area in front of the officer for placement of a laptop computer or communication equipment.

CENTER OVERHEAD PANEL

An overhead console with a removable pewter panel shall be provided on the cab roof between the driver and officer to permit installation of cab stereo, intercom systems, arrow stick controls, etc. The overhead console shall be approximately 27" wide x 4" high x 13" deep and shall be painted to match the interior of the cab. The overhead console shall not obstruct the driver's vision through the officer's side window.

CLIMATE CONTROL SYSTEM

A climate-control system shall be provided for total cab environmental comfort. This system shall provide heat, cooling and defrost capabilities to various areas in the cab. The system shall consist of two (2) evaporator units, mounted in the center overhead of the cab. One (1) unit shall provide defrost, air conditioning and heat for the front of the cab and shall provide heating and cooling for the drivers and officers feet. One (1) unit shall provide heat and air conditioning for the back of the cab.

The ceiling mounted evaporator/heater unit for the front shall include the following:

- Dual high output blower.
- High efficiency coil that includes "rifled" tubing and oversized header tubes for maximum refrigerant distribution.
- Four (4) 3" diameter, adjustable louvers; two (2) each side of the cab overhead, facing the driver and officer seat positions.
- Four (4) 3" diameter, adjustable defroster louvers positioned above the windshield to provide optimum coverage.
- Four (4) 3" diameter adjustable louvers, one (1) below the driver and officer seat positions and one (1) under each outboard rear facing crew seat.
- Damper controls shall be pneumatically operated to provide air discharge to the windshield, front overhead air discharge louvers or floor position as required and shall be located above the driver seat position.
- An electric water valve to control the amount of heat.
- Fully insulated housing.

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- BTU: 34,000 A/C
- BTU: 50,000 Heat
- CFM: 410 @ 13.8 volts

The ceiling mounted evaporator/heater unit for the crew area shall include the following:

- Dual high output blower
- High efficiency coil which includes, "rifled" tubing and oversized header tubes for maximum refrigerant distribution
- Eight (8) 3" diameter, adjustable louvers positioned to provide optimum coverage.
- Fully insulated housing.
- BTU: 36,400 A/C
- BTU: 52,000 Heat
- CFM: 440 @ 13.8 volts

ROOF MOUNT CONDENSER

A 12-volt roof top condenser shall be strategically positioned on the cab roof so as not to interfere with any emergency lighting systems and shall include the following:

- High performance, long life fan assemblies. Fan motors are sealed around housing and shaft areas.
- Condenser and coil design includes rifled tubing for maximum efficiency. Coil is painted black.
- Condenser unit includes receiver drier with hi/lo pressure switch.
- Wire harness includes necessary wiring for clutch circuit as well as a separate power relay circuit.
- 14 gauge mounting brackets
- 16-gauge condenser frame and fan shroud
- 16 gauge aluminum cover, E-coated white

Mounting design will enable easy servicing of all components and unit replacement if necessary.

The ceiling mounted evaporator unit shall be covered with an ergonomically designed custom ABS panel to provide maximum headroom and a pleasing appearance.

The roof mounted air conditioning condenser housing(s) shall be painted to match the cab roof color.

CLIMATE CONTROL SWITCHES

The drivers overhead panel shall contain all controls for the cab climate control system. The following controls shall be provided: mode selector switch, front fan speed switch, rear fan speed switch, air conditioning on/off switch, and temperature control dial. All controls shall be clearly labeled, adequately backlit, and installed in an easily removable panel.

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CAB TILT ASSEMBLY

The cab tilt mechanism shall be custom designed for ease of maintenance and shall consist of two (2) hydraulic cylinders with a maximum lift capacity of 19,625 pounds. Hydraulic lines shall be rated at 20,000 PSI burst pressure. Each cylinder shall have an attached hydraulic locking mechanism, in the event of a hydraulic failure. Hydraulic cylinders shall be detachable to allow removal of the engine for major service. A mechanical cylinder stay bar and release shall be provided to insure a positive lock in the tilted position.

The two (2) rear outboard cab latches shall be of the hydraulic pressure release, automatic re-latching type, and provide an automatic positive lock when the cab is lowered. The latch must not disengage or experience any damage when subjected to a pull apart tensile load of 6,000 lbs. The hydraulic pressure required to unlock the latch shall not exceed 550 PSI. The latch shall withstand 5,000 PSI without leaks or damage and withstand 1,000 continuous cycles of operation under a load of 1,000 lbs at liftoff. The tilt pump shall be electric over hydraulic type, with a pressure rating of not less than 4,000 PSI. Additionally, the cab tilt device shall be both electrically and hydraulically interlocked to prevent inadvertent activation of the cab tilt system.

- A "CAB NOT LATCHED" indicator shall be provided in the cab dash-warning cluster.
- A dual switch control system shall be provided for the cab tilt, located behind the passenger side pump panel, unless otherwise specified. System shall consist of a three (3) position toggle switch along with a rubber covered push button switch. Cab up/down shall be controlled by the toggle switch; the down position shall be spring loaded so the cab descent will stop immediately when this switch is released.

TETHER CONTROL FOR CAB TILT

A 12' tether control shall be provided to control the cab movement. This arrangement will provide the operator with a full view of the cab. The control shall include a two (2) switch control, one (1) three (3) position toggle switch and one (1) push button type switch. Both controls must be depressed for activation of the system. The tether control shall be equipped with a detachable cord which can be plugged into a receptacle located on the front bumper.

CHASSIS FRAME ASSEMBLY

The chassis frame shall be fabricated in its entirety in the factory of the apparatus manufacturer. This shall prevent any split responsibility in warranty or service.

The frame shall consist of two (2) channels fastened together by cross members. All structural fasteners used in the frame shall be Grade 8 hardware. Hardened steel washers shall be used under all bolt heads and nuts to avoid stress concentrations. Top flange shall be free of bolt heads. All spring hangers shall be machined steel castings. Weldment type chassis and the use of Huck bolts shall not be acceptable.

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Each main frame rail shall be 10-1/4" x 4" x 3/8", fabricated from 110,000 PSI minimum yield steel, with a minimum section modulus of 17.97 in 4 and a resisting bending moment (RBM) of 1,976,700 inch pounds.

Formed frame rails or a fish plated frame shall not be acceptable.

The chassis frame assembly, consisting of frame rails, cross members, axles and steering gear(s), shall be finish painted before installation of any electrical wiring, fuel system components, or air system components. All components or brackets fastened to the frame rails shall be cleaned, primed and painted prior to being attached to the frame rails.

PAINTED STEEL FRONT BUMPER

A 10" high x full width, painted steel front bumper shall be provided. The bumper shall be constructed from a minimum of .135 gauge steel, which shall be designed with 45-degree welded corners and a 2" flange on the top and bottom. The ends of the bumper shall be supported by horizontal channels, which shall extend from the frame rails to the sides of the bumper. The color of the bumper shall match the cab and body base color.

The bumper shall be extended 22" with a polished aluminum tread plate gravel shield enclosing the top and ends.

STORAGE WELL - CENTER

One (1) storage well constructed of 1/8" aluminum shall be installed in the gravel shield for storage of an Igloo 35 quart cooler. This storage well shall be center mounted between the chassis frame rails. The bottom of the storage well shall have a minimum of four (4) drain holes.

The center front bumper hose well shall be furnished with Velcro straps to secure the hose stored in the well. The straps shall be attached to each side of the hose well with stainless steel footman loops.

STORAGE WELL - DRIVER SIDE

One (1) storage well constructed of 1/8" aluminum shall be installed in the gravel shield for storage of 150' of 1-3/4" hose. This storage well shall be located on the driver side of the bumper extension. The bottom of the storage well shall have a minimum of four (4) drain holes.

The driver side front bumper hose well shall be furnished with a vinyl cover to secure the hose stored in the well. The cover shall be attached to the hose well with Velcro. Black decking shall be furnished in the compartment for air flow and drainage.

The driver's well Hypalon cover shall be red in color.

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STORAGE WELL - OFFICER SIDE

One (1) storage well constructed of 1/8" aluminum shall be installed in the gravel shield for storage of a 35' roll of 5" soft suction hose. This storage well shall be located on the officer side of the bumper extension. The bottom of the storage well shall have a minimum of four (4) drain holes.

The officer side front bumper hose well shall be furnished with a vinyl cover to secure the hose stored in the well. The cover shall be attached to the hose well with Velcro. Black decking shall be furnished in the compartment for air flow and drainage.

The officer's well Hypalon cover shall be red in color.

TOW HOOKS

Two (2) front painted tow hooks shall be fastened directly to the frame, below the front bumper. The tow hooks shall be fastened with grade 8 bolts and nuts.

FRONT AXLE

Front axle shall be a Meritor MFS-20-133 A-N, includes low friction "Easy Steer" bushing technology for maximum steering ease and longer life.

The front axle shall be rated at 22,500 lbs. (Minimum)

FRONT DISC BRAKES

Meritor EX-225 H, 17" disc brakes shall be provided for the front axle. The front brakes will be full air actuated with automatic slack adjustment.

Premium oil seals with viewer glass shall be provided on the front axle.

FRONT SUSPENSION

Front suspension shall be progressive rate front leaf springs. The spring shall be permanently pinned at the front and have a shackle double pinned mounting at the rear. Suspensions allowing the spring to float freely at the ends without a permanent pin shall not be acceptable.

The front leaf springs shall have a minimum of 10 leaves, a minimum length of 51", and a minimum width of 3-1/2". The capacity at ground shall be 23,000 lbs. All springs shall be of center bolt design. Cup center springs shall not be acceptable. All spring pins shall be positively restrained from rotating in brackets and shackles.

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FRONT SHOCK ABSORBERS

The front suspension system shall be equipped with Monroe, Model "Magnum - 70", double acting hydraulic shock absorbers. Shock absorbers to have a minimum bore of 1.38" and an outside diameter of approximately 3-1/4".

REAR AXLE

Rear axle shall be a single, Meritor RS-26-185 with a capacity of 27,000 lbs. (Minimum). The axle shall be a single reduction axle with hypoid gearing and oil-lubricated wheel bearings. Oil seals shall be provided as standard equipment.

REAR BRAKES

Meritor EX-225 H, 17" disc brakes shall be provided for the rear axle. The front brakes will be full air actuated with automatic slack adjustment.

REAR AXLE TOP SPEED

The rear axle/s shall be geared for an approximate vehicle top speed of 65 MPH.

REAR SUSPENSION

The rear suspension shall be leaf type, variable rate with a 31,000 lb. rating. The main spring assembly shall consist of 14 leaves with the main spring measuring 60.5" L x 3" W.

There shall be a helper spring 38" long X 3" wide X 1-7/16" with 4 leaves, rated at 4,500 lbs. Two (2) fully wrapped leaves shall transmit driving and braking torque. The rating shall be designed to match or exceed the rear axle. Designs allowing the main pack to float are not acceptable.

BRAKE SYSTEM

A dual circuit, air operated braking system, meeting the design and performance requirements of FMVSS -121 and the operating test requirements of NFPA 1901 current edition shall be installed. It shall be direct air type with dual air treadle in the cab. The system shall be powered by an engine mounted, gear driven air compressor protected by a heated air dryer.

The air system shall be plumbed with reinforced, air brake tubing/hose in conformance to SAE J 844-94, Type B and U.S.D.O.T. standards. The compressor discharge shall be plumbed with stainless

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steel braided hose lines with a Teflon lining. Nylon airlines shall be enclosed in high temperature convoluted loom which shall run along the inside frame rails. It shall be secured with non-conductive, corrosion resistant strapping mounted with standoff fasteners. Cord reinforced rubber hose lines with brass fittings shall be installed from the frame rails to axle mounted air connections.

The air system shall provide a rapid air build-up feature and low-pressure protection valve with light and buzzer, designed to meet the requirements of NFPA 1901, current edition.

ABS SYSTEM

An Anti-Skid Braking System (ABS) shall be provided to improve braking control and reduce stopping distance. This braking system shall be fitted to all of the axles. All electrical connections shall be environmentally sealed, water, weatherproof, and vibration resistant.

The system shall constantly monitor wheel behavior during braking. Sensors on each wheel shall transmit wheel speed data to an electronic processor which shall sense approaching wheel lock causing instant brake pressure modulation up to 5 times per second in order to prevent wheel lockup. Each wheel shall be individually controlled.

To improve service trouble shooting, provisions in the system for an optional diagnostic tester shall be provided. The system shall test itself each time the vehicle is started. A dash-mounted light shall go out once the vehicle has attained 4 mph after successful ABS start-up. To improve field performance, the system shall be equipped with a dual circuit design. The system circuits shall be configured in a diagonal pattern. Should a malfunction occur, the defective circuit shall revert to normal braking action. A warning light shall signal malfunction to the operator. The system shall consist of a wheel mounted toothed ring, sensor, sensor clip, electronic control unit and solenoid control valve.

The sensor clip shall hold the sensor in close proximity to the toothed ring. An inductive sensor consisting of a permanent magnet with a round pole pin and coil shall produce an alternating current with a frequency proportional to wheel speed. The unit shall be sealed, corrosion resistant and protected from electromagnetic interference. The electronic control unit shall monitor the speed of each wheel. A deviation shall be corrected by cyclical brake application and release. If a malfunction occurs, the defective circuit shall signal the operator and the malfunctioning portion of the system shall shut down. The system shall be installed in a diagonal pattern for side-to-side control. The system shall insure that each wheel is braking to optimum efficiency up to 5 times a second.

The system shall also control application of the auxiliary engine exhaust or drive line brakes to prevent wheel lock.

This system shall have a three (3) year or 300,000 mile parts and labor warranty as provided by Meritor Wabco Vehicle Control Systems.

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ROLL STABILITY CONTROL

The chassis shall be equipped with a Meritor "RSC" Roll stability Control system. The "RSC" monitors the vehicle's rollover threshold and activates a computerized device to slow the vehicle when the threshold is exceeded.

Normal vehicle operation automatically resumes once problematic conditions cease.

"RSC" is integrated into the ABS and ATC systems.

BRAKE AIR RESERVOIRS

There shall be a minimum of three (3) air reservoirs installed in conformance with best automotive practices.

An additional 800 cu. in. air reservoir shall be provided for the accessory air outlet.

Reservoir capacity total shall be a minimum of 5200 cubic inches.

PROTECTED AIR RESERVOIR SYSTEM

In addition to the standard air brake system, a mechanical means of releasing the spring brake shall be provided in the event of total loss of air pressure, consisting of an additional protected reservoir (2400 cu. In.), separate pressure gauge and a SR control valve on the dash.

There shall be heated automatic moisture ejector provided on the primary or wet tank.

For ease of daily maintenance, each air system reservoir shall be equipped with a brass 1/4 turn drain valve.

AIR DRYER

A Bendix #AD-9 heated air dryer shall be furnished. An automatic moisture ejector on the primary, or wet tank, shall also be furnished

AIR LINES

The entire chassis air system shall be plumbed utilizing reinforced, Synflex air lines. All of the airlines shall be color coded to correspond with an air system schematic and shall be adequately protected from heat and chafing.

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AIR COMPRESSOR

Air compressor shall be a Wabco brand, minimum of 18.7 cubic feet per minute capacity. Air brake system shall be the quick build up type. The air compressor discharge line shall be stainless steel braid reinforced Teflon hose.

A pressure protection valve shall be installed to prevent the use of air horns or other air operated devices should the air system pressure drop below 80 psi (552 kPa).

The chassis air system shall meet NFPA 1901, latest edition for rapid air pressure build-up within sixty (60) seconds from a completely discharged air system. This system shall provide sufficient air pressure so that the apparatus has no brake drag and is able to stop under the intended operating conditions following the sixty (60) seconds build-up time.

BRAKE TREADLE VALVE

A Bendix dual brake treadle valve shall be mounted on the floor in front of the driver. The brake control shall be positioned to provide unobstructed access and comfort for the driver.

PARKING BRAKE

Parking brake shall be of the spring-actuated type, mounted on the rear axle brake chambers. The parking brake control shall be accessible for both the driver and officer. The center instrument panel, shall be designed to accommodate the control centered between the driver and officer. A red indicator light shall be provided in the driver dash panel that shall illuminate when the parking brake is applied.

FRONT WHEELS & TIRES

The front wheels shall be 22.5" x 12.25" ten stud, hub piloted polished aluminum disc type.

The aluminum disc front wheels shall be provided with bright nut covers and hub caps.

The front tires shall be Michelin 425/65R22.5 "20 Ply" tubeless radial XZY-3 aggressive highway tread. Tires shall be rated at 22,800 lbs.

REAR WHEELS & TIRES

The single rear axle wheels shall be 22.5" x 8.25" ten stud, hub piloted polished aluminum disc type.

The single rear axle aluminum disc wheels shall be provided with bright nut covers and hub caps.

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The rear tires shall be Michelin 12R22.5 "16 Ply" tubeless radial XDS traction tread. Tires shall be rated at 28,880 lbs.

ENGINE

Engine shall be a Cummins, Model ISM 500, diesel, turbo-charged, per the following specifications.

- Max. Horsepower 500 HP @ 1900 RPM
- Governed Speed 2100 RPM
- Peak Torque 1550 lb. ft. @ 1200 RPM
- Cylinders Six (6)
- Operating Cycles Four (4)
- Bore & Stroke 4.9 x 5.8 in.
- Displacement 661 cu. in.
- Compression Ratio 16.1:1
- Governor Type Limiting Speed
- Drive line Size 1810 Series

Engine oil filters shall be engine manufacturers branded or approved equal. Engine oil filters shall be accessible for ease of service and replacement.

A fuel/water separator shall be provided.

The manufacturer shall be able to furnish proof of engine installation approval by the engine manufacturer.

COOLING/RADIATOR

Radiator shall be brass with bolted steel top and bottom tanks. The cooling system shall be designed for a maximum of fifteen (15) PSI operation. There shall be a sight glass in the radiator to check the coolant level without removing the radiator cap. The core construction shall be tube and fin with three (3) tube rows, 273 total core tubes, and fourteen (14) fins per inch.

Engine coolant shall be treated with supplementary coolant additives (SCA's) required by the engine manufacturer. Engine coolant shall provide anti-freeze protection to -30° F. The mixture shall be per the engine manufacture's specifications.

A transmission oil to liquid cooler shall be furnished.

Core area shall be a minimum of 1375 square inches (39 H x 35.25W).

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RADIATOR SKID PLATE

The chassis shall be designed with a removable heavy-duty radiator skid plate to protect the radiator from debris or obstructions under the chassis. The skid plate shall be constructed from steel, which shall enclose the lower section of the radiator and cooling system components mounted on the lower section of the radiator. The skid plate shall be designed so the angle of approach is not affected.

CHARGE AIR COOLER

The charge air cooler shall be constructed of aluminum with cast aluminum side tanks. The cooler shall have a frontal core size of 957 square inches, seven (7) fins per inch, and forty eight (48) core tubes.

The charge air cooler shall be mounted directly ahead of the radiator and to the radiator headers. Rubber isolators shall be used at the mounting points to reduce transmission of vibrations.

The piping between the charge air cooler and engine shall use heavy duty hoses with stainless steel bands. Bands are used to maintain the shape of the hose during changing turbo boost pressures. The hoses shall be attached with stainless steel constant torque hose clamps.

COOLING SYSTEM FAN

The engine cooling system shall incorporate a heavy duty fan, installed on the engine and include a shroud.

The fan shall be equipped with an air operated clutch fan, which shall activate at a pre-determined temperature range.

Re-circulation shields shall be installed to ensure that air which has passed through the radiator is not drawn through it again.

A one and one-half (1-1/2) gallon coolant recovery system shall be provided, located inside the engine enclosure and shall be accessible from the access hatch located at the rear of the engine enclosure.

Heavy duty silicone heater hoses shall be furnished for the heater system. All coolant hoses shall be equipped with constant torque type hose clamps. All integral hoses supplied with the engine shall be as supplied by the engine manufacturer.

The engine manufacturer's required spin on water filter shall be furnished as provided by the engine manufacturer. Manual shut off valves at the filter shall also be furnished.

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LOW COOLANT INDICATOR LIGHT AND ALARM

A low engine coolant indicator light located in the dash instrument panel shall be provided. An audible alarm shall be provided to warn of the low coolant condition.

ENGINE BRAKE

A Jacobs engine compression brake shall be furnished for increased braking capabilities. Controls shall be as provided by the engine manufacturer and shall be activated by releasing the throttle pedal to the idle position.

The engine compression brake shall have dash mounted control switches to turn the brake on or off as well as to control the operational level of the brake.

The engine brake shall be wired in such a manner so as to illuminate the chassis brake lights when the engine brake is engaged and operating.

The engine brake shall be interlocked with the PTO operation and shall automatically disengage any time the apparatus is operating with the PTO active.

ENGINE FAST IDLE

A fast idle for the electronic controlled engine shall be provided. The fast idle shall be controlled by an ON/OFF switch on the dash.

An electronic interlock system shall prevent the fast idle from operating unless the transmission is in "Neutral" (or "Park" if so equipped) and the parking brake is fully engaged. If the fast idle control is used in conjunction with a specified engine/transmission driven component or accessory, the fast idle control shall be properly interlocked with the engagement of the specified component or accessory.

AIR CLEANER

An engine air cleaner shall be provided. Air cleaner shall include a dry type element. Air cleaner shall be installed in accordance with the engine manufacturer's recommendations. The air cleaner shall be located to the rear of the engine, with streamline air pipes and hump hose connections from the inlet to the air cleaner and from the air cleaner to the turbo. The air cleaner shall be easily accessible when the cab is tilted.

Air cleaners mounted on the side or near the bottom of the cab shall not be acceptable. [NO EXCEPTIONS]

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SPARK ARRESTOR

A spark arrestor shall be installed in the chassis air intake system. This arrestor shall be mounted behind the intake grille to filter out airborne embers. The spark arrestor housing must be easily accessible when the cab is tilted.

ACCELERATOR CONTROL

A floor mount accelerator pedal shall be installed on the floor in front of the driver. The pedal shall be positioned for comfort with ample space for fire boots and adequate clearance from the brake pedal control.

TRANSMISSION

An Allison World Transmission, Model 4000 EVS electronically controlled, automatic transmission shall be provided. Transmission specifications shall be as follows:

- Max. Gross Input Power 600 HP
- Max. Gross Input Torque 1850 lb. ft.
- Input Speed (Range) 1700- 2300 RPM
- Shift Calibrations 5 Speed (6th not avail. for fire appl.)
- Direct Gear (Pumping) 4th (Lock-up)
- Direct Gear Ratio 1.00:1
- Overdrive Ratio 0.74:1

Transmission installation shall be in accordance with the transmission manufacturer's specification. The transmission shall be readily and easily removable for repairs or replacement.

An illuminated, touch-pad type shift control shall be mounted in the cab, convenient to the driver. Shift control shall be approved by the transmission manufacturer.

TRANSMISSION OIL LEVEL SENSOR

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

SYNTHETIC TRANSMISSION FLUID

Castrol "TRANSYND" or an equivalent synthetic TES 295 transmission fluid shall be utilized to fill the 4000 EVS transmission.

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PARK TO NEUTRAL

The transmission, upon application of the parking brake, automatically shift into neutral.

DRIVE LINES

Drive lines shall be Dana (Spicer) 1810 heavy duty series or equal, with "glide coat" splines on all slip shafts. The chassis manufacturer shall utilize an electronic type balancing machine to statically and dynamically balance all drive shafts. The chassis manufacturer shall be able to provide proof of compliance with all drive shaft manufacturer's standards and specifications. (No Exceptions)

EXHAUST SYSTEM

The exhaust system shall be installed in accordance with the engine manufacturer's requirements and meet all Cummins Non - DPF system requirements and State noise level requirements. Exhaust system components shall be securely mounted and easily removable.

The muffler shall be sized to be compatible with the engine exhaust discharge.

Exhaust tubing shall be a minimum of 16 gauge material. Any flexible exhaust tubing shall be HDT stainless steel type. To minimize heat build-up, exhaust tubing within the engine compartment shall be wrapped with an insulating material. Exhaust shall be wrapped from the turbocharger to the entrance of the muffler. Material shall be held in place with worm gear type clamps.

The exhaust tailpipe extending from the muffler (DPF) to the side of the vehicle shall be constructed from 16-gauge aluminized steel tubing. The exhaust discharge shall be on the right side of the apparatus forward of the rear axle.

PROVISIONS FOR PLYMOVENT EXHAUST EXTRACTION SYSTEM

The exhaust outlet shall be straight pipe, discharging out the officer side of the apparatus, forward of the rear axle, terminating minimum 6" forward of rear tire, minimum 2.5" below rub rail/body, and flush with outboard of rub rail/body to connect with a Plymovent ventilation system.

FUEL TANK

Fuel tank shall be a minimum of sixty-five (65) gallon capacity. It shall have a minimum fuel filler neck of 2" ID. A 1/2" minimum diameter drain plug shall be provided. The tank shall be fabricated from hot rolled, pickled and oiled steel. Provisions for an additional feed line and fuel level float shall be provided for apparatus manufacturer's use.

The fuel tank shall be installed behind the rear wheels between the frame rails.

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The fuel tank shall meet all FHWA 393.67 requirements including a fill capacity of 95% of tank volume.

The fuel lines shall be wire braid reinforced fuel hose. The lines shall be carefully routed and secured along the inside of the frame rails.

FUEL COOLING SYSTEM

A fuel cooling system shall be provided. The heat exchanger shall be a tube and fin type and shall be a separate unit. The cooler shall be mounted forward of the radiator and plumbed to the fuel return line.

FUEL FILTER/WATER SEPARATOR

A Racor Model 490RP-12-30 heated fuel/water separator shall be furnished with indicator light and audible alarm on the dash.

FUEL POCKET

A fuel fill shall be provided in the left side rear wheel well area **with a cap lanyard**. A Cast Products heavy duty cast aluminum spring loaded hinged fill door shall be provided.

A label indicating "DIESEL FUEL ONLY" shall be provided adjacent to the fuel fill.

A polished stainless steel trim panel shall be provided around the fuel fill door on the side of the body panel.

DUAL POWER STEERING

A DUAL power steering system shall be provided utilizing a Sheppard Model #M110 main steering gear on the driver side of the chassis and a duplicate Sheppard Model #M110 power steering gear on the officer side of the chassis. The power steering gear on the officer side of the chassis will increase performance in turning the officer side wheel assembly, reducing loads and forces on the main gear and components as well as providing redundancy in the event of a steering failure. The steering system shall be designed to maximize the turning capabilities of the front axle no matter the rating and tire size. The use of a power assist cylinder on the officer side of the chassis is NOT ACCEPTABLE.

The system shall be designed utilizing an engine driven hydraulic pump, with a maximum operating pressure of 2000 PSI. Steering design shall permit a maximum of 5.6 turns from stop to stop. Steering system components shall be mounted in accordance with the steering gear manufacturer's instructions.

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STEERING WHEEL

The steering wheel shall be vinyl padded, minimum 18" diameter, with a center hub mounted horn button. There shall be a self-canceling, directional signal lever and a traffic hazard switch on the steering column. The high beam activator shall be controlled by pulling the directional signal lever toward the driver.

The steering column shall have a separate lever control for tilting and telescoping capability.

ROAD SAFETY KIT

A road safety kit shall be furnished with the following equipment:

- 2 1/2 lb. B-C fire extinguisher
- Triangle safety reflectors
- Wheel lug wrench

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CHASSIS ELECTRICAL SYSTEM

All electrical wiring in the chassis shall be SXL cross link insulated type. Wiring is to be color coded and include function codes every three (3) inches on both sides. Wiring harnesses shall be routed in protective, heat resistant loom, securely and neatly installed. Two (2) power distribution centers shall be provided in central locations for greater accessibility. The power distribution centers shall contain automatic thermal self resetting breakers, power control relays, flashers, diode modules, daytime driving light module, and engine and transmission data links. All breakers and relays shall have a capacity substantially greater than the expected load on the related circuit, thus ensuring long component life. Power distribution centers shall be composed of a system of interlocking plastic modules for ease of custom construction.

The power distribution centers shall be function oriented. The first is to control major truck function. The second control center shall enable overhead switching and interior operations. Each module shall be single function coded and labeled to aid in troubleshooting. The centers shall also have accessory breakers and relays for future installations. All harnesses and power distribution centers shall be electrically tested prior to installation to ensure the highest system reliability.

All external harness interfaces shall be of a triple seal type connection to ensure a proper connection. The cab/chassis and the chassis/body connection points shall be mounted in accessible locations. Complete chassis wiring schematics shall be supplied with the apparatus.

WIRING HARNESS DESCRIPTION

The wiring harness contained on the chassis shall be designed to utilize wires of stranded copper or copper alloy of a gauge rated to carry 125% of maximum current for which the circuit is protected without exceeding 10% voltage drop across the circuit. Wiring must be uniquely identified by color code or circuit function code, labeled at a minimum of every three (3) inches. The identification of the wiring shall be referenced on a wiring diagram. All wires conform to SAEJ1127 (Battery Cable), SAEJ1128 (Low Tension Primary Cable), SAEJ1560 (Low Tension Thin Wall Primary Cable).

The covering of harnesses shall be moisture resistant loom with a minimum rating of 289 Degrees Fahrenheit and a flammability rating of VW-1 as defined in UL62. The covering of jacketed cable shall have a minimum rating of 289 degree Fahrenheit.

All harnesses must be securely installed in areas protected against heat, liquid contaminants and damage. The harness connections and terminations shall use a method that provides a positive mechanical and electrical connection and are in accordance with the device manufacturer's instructions. No connections within the harness may utilize wire nut, insulation displacement, or insulation piercing components.

All circuits shall conform to SAEJ1292. All circuits must be provided with low voltage over current protective devices. These devices shall be readily accessible and protected against heat in excess of component rating, mechanical damage, and water spray. Star washers shall not used for ground connections.

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DIRECT GROUNDING STRAPS

Direct grounding straps shall be mounted to the following areas; frame to cab, frame to body and frame to pump enclosure.

All exposed electrical connections shall be coated with "Z-Guard 8000" to prevent corrosion.

EMI/RFI PROTECTION

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

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

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

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

12 VOLT ELECTRICAL SYSTEM TESTING

The apparatus low voltage electrical system shall be tested and certified by the apparatus manufacture. The certification shall be provided with the apparatus. All tests shall be performed with air temperature between 0°F and 100°F.

The following three (3) tests shall be performed in order. Before each test, the batteries shall be fully charged.

TEST #1-RESERVE CAPACITY TEST

The engine shall be started and kept running until the engine and engine compartment temperatures are stabilized at normal operating temperatures and the battery system is fully charged. The engine shall be shut off and the minimum continuous electrical load shall be activated for 10 minutes. All electrical loads shall be turned off prior to attempting to restart the engine. The battery system shall then be capable of restarting the engine. Failure to restart the engine shall be considered a test failure.

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TEST #2-ALTERNATOR PERFORMANCE TEST AT IDLE

The minimum continuous electrical load shall be activated with the engine running at idle speed. The engine temperature shall be stabilized at normal operating temperature. The battery system shall be tested to detect the presence of battery discharge current. The detection of battery discharge current shall be considered a test failure.

TEST #3-ALTERNATOR PERFORMANCE TEST AT FULL LOAD

The total continuous electrical load shall be activated with the engine running up to the engine manufacturers governed speed. The test duration shall be a minimum of 2 hours. Activation of the load management system shall be permitted during this test. However, an alarm sounded due to excessive battery discharge, as detected by the system, or a system voltage of less than 11.7 volts DC for a 12 volt system, for more than 120 seconds, shall be considered a test failure.

LOW VOLTAGE ALARM TEST

Following completion of the preceding tests, the engine shall be shut off. The total continuous electrical load shall be activated and shall continue to be applied until the excessive battery discharge alarm is activated.

The battery voltage shall be measured at the battery terminals. With the load still applied, a reading of less than 11.7 volts shall be considered a test failure. The battery system shall then be able to restart the engine.

At time of delivery, documentation shall be provided with the following information:

- Documentation of the electrical system performance test
- A written load analysis of the following;
- Nameplate rating of the alternator
- Alternator rating at idle while meeting the minimum continuous electrical load
- Each component load comprising the minimum continuous electrical load.
- Additional loads that, when added to the minimum continuous load, determine the total connected load.
- Each individual intermittent load.

ELECTRICAL MANAGEMENT SYSTEM

A Class 1 ES-Key Electrical Management System shall be utilized on the chassis for all functions applicable. The system shall consist of the following components:

A Display shall be mounted in the center cab dashboard panel that shall serve as an informational, status and diagnostic view panel for the vehicles electrical system.

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A Modem with a RS232 computer interface and standard telephone jack used to not only program the multiplex system but also serve as a factory direct gateway into the vehicle from any Class 1 multiplex authorized service facility.

A Universal System Manager (USM), which acts as the main controlling component of the multiplexing system shall be provided and factory programmed to DOT, NFPA, SAE, the apparatus manufacturer's and XYZ Fire Department specifications. The programming shall be done by the apparatus manufacturer's engineering department. The ES-Key system installation shall comply with SAE J 551 requirements regarding Electromagnetic and Radio Frequency interference (EMI, RFI), as well as utilize components and wiring practices that insure the system is protected against corrosion, excessive temperatures, water, excessive physical, and vibration damage by any equipment installed on the vehicle at the time of delivery.

A series of Multiplexing Input/Output Modules shall be installed. The Input/Output modules shall permit the multiplexing system to reduce the amount of wiring and components used as compared to non-multiplexed apparatus. These modules shall vary in I/O configuration, be waterproof allowing installation outside of enclosed areas and shall possess individual output internal circuit protection. The modules shall also have three status indicators visible from a service persons vantage point that shall indicate the status of the module. In the event a load requires more than 7.5 AMPS of operating current, the module shall activate a simple relay circuit integral to any of the 3 dillbox assemblies installed in the cab.

INTERLOCK INTERFACE MODULE

A Vocation Module, which is the interface between the multiplexing system and the pump system shall be provided.. This module shall serve as the interface between the operator, engine, transmission and pumping system. The module shall be installed under the drivers side dash, in a sealed enclosure that shall possess green indicating LED's that shall indicate to service personnel the interlock state of the apparatus. In the event of a multiplexing error involving pump operation can be activated to ensure reliable pumping operations at ALL times. In addition to controlling pump function, this vocation module shall be able to provide automatic and/or manual activation of engine "Fast Idle", to maintain adequate alternator output and thus, chassis voltage. NO EXCEPTIONS!

DIAGNOSTICS

Diagnostic ports shall be accessible while standing on the ground and located inside the drivers side door left of the steering column. The diagnostic panel shall allow diagnostic tools such as computers to connect to various vehicle systems for improved troubleshooting providing a lower cost of ownership. Diagnostic switches shall allow engine and ABS systems to provide blink codes should a problem exist.

The diagnostic system shall include the following:

- Engine diagnostic port
- Transmission and ABS diagnostic port
- Roll sensor diagnostic port (if applicable)

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Additional diagnostic locations under the officers side of the dash.

- Engine diagnostic switch (blink codes)
- ABS diagnostic switch (blink codes)

ADVANCED DIAGNOSTICS

An advanced, diagnostic software program shall be provided. The software shall provide troubleshooting tools to service technicians equipped with a computer.

The service and maintenance software shall be easy to understand and use, have the ability to view system input/output (I/O) information, and include a connection from a computer to the vehicle.

VOLTAGE MONITOR SYSTEM

A voltage monitoring system shall be provided to indicate the status of the battery system connected to the vehicle's electrical load. The system shall provide visual and audible warning when the system voltage is below or above optimum levels.

The alarm shall activate if the system falls below 11.8 volts DC for more than two (2) minutes.

INDICATOR LIGHT AND ALARM PROVE-OUT SYSTEM

A system shall be provided which automatically tests basic indicator lights and alarms located on the cab instrument panel.

SEQUENCER

A sequencer shall be provided that automatically activates and deactivates vehicle loads in a preset sequence thereby protecting the alternator from power surges. This sequencer operation shall allow a gradual increase or decrease in alternator output, rather than loading or dumping the entire 12 volt load to prolong the life of the alternator.

Emergency light sequencing shall operate in conjunction with the emergency master light switch. When the emergency master switch is activated, the emergency lights shall be activated one by one at half second intervals. Sequenced emergency light switch indicators shall flash while waiting for activation.

When the emergency master switch is deactivated, the sequencer shall deactivate the warning light loads in the reverse order.

Rear of cab Air-Conditioning and Heat will be load managed.

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ELECTRICAL HARNESS REQUIREMENT

To ensure dependability, all 12-volt wiring harnesses installed by the apparatus manufacturer shall conform to the following specifications:

- SAE J 1128 - Low tension primary cable
- SAE J 1292 - Automobile, truck, truck-tractor, trailer and motor coach wiring
- SAE J 163 - Low tension wiring and cable terminals and splice clips
- SAE J 2202 - Heavy duty wiring systems for on-highway trucks
- NFPA 1901 - Standard for automotive fire apparatus
- FMVSS 302 - Flammability of interior materials for passenger cars, multipurpose passenger vehicles, trucks and buses
- SAE J 1939 - Serial communications protocol
- SAE J 2030 - Heavy-duty electrical connector performance standard
- SAE J 2223 - Connections for on board vehicle electrical wiring harnesses
- NEC - National Electrical Code
- SAE J 561 - Electrical terminals - Eyelet and spade type
- SAE J 928 - Electrical terminals - Pin and receptacle type A

For increased reliability and harness integrity, harnesses shall be routed throughout the cab and chassis in a manner which allows the harnessing to be laid into it's mounting location. Routing of harnessing which requires pulling of wires through tubes shall not be allowed.

Wiring shall be run in loom or conduit where exposed, and have grommets or other edge protection where wires pass through metal. Wire colors shall be integral to each wire insulator and run the entire length of each wire. Harnessing containing multiple wires and uses a single wire color for all wires shall not be allowed. Function and number codes shall be continuously imprinted on all wiring harness conductors at 3.00" intervals. All wiring installed between the cab and into doors shall be protected by a wire conduit to protect the wiring. Exterior exposed wire connectors shall be positive locking, and environmentally sealed to withstand elements such as temperature extremes, moisture and automotive fluids. Electrical wiring and equipment shall be installed utilizing the following guidelines:

- All holes made in the roof shall be caulked with silicon (no exception). Large fender washers, liberally caulked, shall be used when fastening equipment to the underside of the cab roof.
- Any electrical component that is installed in an exposed area shall be mounted in a manner that shall not allow moisture to accumulate in it. Exposed area shall be defined as any location outside of the cab or body.
- For low cost of ownership, electrical components designed to be removed for maintenance shall be quickly accessible. For ease of use, a coil of wire shall be provided behind the appliance to allow them to be pulled away from the mounting area for inspection and service work.
- Corrosion preventative compound shall be applied to non-waterproof electrical connectors located outside of the cab or body. All non-waterproof connections shall re-quire this compound in the plug to prevent corrosion and for easy separation of the plug.
- Any lights containing non-waterproof sockets in a weather-exposed area shall have corrosion

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preventative compound added to the socket terminal area.

- All electrical terminals in exposed areas shall have protective coating applied completely over the metal portion of the terminal.
- Rubber coated metal clamps shall be used to support wire harnessing and battery cables routed along the chassis frame rails.
- Heat shields shall be used to protect harnessing in areas where high temperatures exist. Harnessing passing near the engine exhaust shall be protected by a heat shield.
- Cab and crew cab harnessing shall not be routed through enclosed metal tubing. Dedicated wire routing channels shall be used to protect harnessing therefore improving the overall integrity of the vehicle electrical system. The design of the cab shall allow for easy routing of additional wiring and easy access to existing wiring.
- All standard wiring entering or exiting the cab shall be routed through sealed bulkhead connectors to protect against water intrusion into the cab.

BATTERY CABLE INSTALLATION

All 12-volt battery cables and battery cable harnessing installed by the apparatus manufacturer shall conform to the following requirements:

- SAE J 1127 - Battery Cable
- SAE J 561 - Electrical terminals, eyelets and spade type
- SAE J 562 - Nonmetallic loom
- SAE J 836 A - Automotive metallurgical joining
- SAE J 1292 - Automotive truck, truck-tractor, trailer and motor coach wiring
- NFPA 1901 - Standard for automotive fire apparatus

Battery cables and battery cable harnessing shall be installed utilizing the following guidelines:

- Splices shall not be allowed on battery cables or battery cable harnesses.
- For ease of identification and simplified use, battery cables shall be color coded. All positive battery cables shall be marked red in color. All negative battery cables shall be black in color.
- For ease of identification, all positive battery cable isolated studs throughout the cab and chassis shall be red in color.
- For increased reliability and reduced maintenance, all electrical buss bars located on the exterior of the apparatus shall be coated to prevent corrosion.

An operational test shall be conducted to ensure that any equipment that is permanently attached to the electrical system is properly connected and in working order.

ALTERNATOR

The alternator shall be Leece Neville Model 4890JB, 320 amp, serpentine belt driven unit. The installation shall include a brush less design with an integral self-diagnostic regulator and rectifier for

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compact installation.

The alternator installation shall be designed to provide maximum output at engine idle speed to meet the minimum continuous electrical load of the apparatus as required.

BATTERY SYSTEM

Five (5) Group 31, maintenance free batteries shall be provided. Each battery shall be rated at 925 CCA at 0° F. Reserve capacity shall be 180 minutes. Wiring for the batteries shall be 4/0 welding type dual path starting cables for SAEJ541.

BATTERY STORAGE

Batteries shall be securely mounted in fixed stainless steel trays located on each side of the chassis frame. Complete access shall be provided when the cab is fully tilted. Batteries shall be mounted on non-corrosive matting material.

BATTERY DISCONNECT SWITCH

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

BATTERY JUMPER STUDS

A set of Cole Hersee battery jumper studs, Model #46210-02 (red) and #46210-03 (black) shall be provided to allow the battery system to be jump started or charged from an external source. The studs shall be located on the driver's side of the chassis and shall be equipped with rubber protector caps.

120 VOLT SHORELINE CONNECTION - "SUPER" AUTO EJECT

One (1) Kussmaul "Super" Auto Eject Model 091-55-20-120, automatic, 120 volt, 20 amp shoreline disconnect shall be provided for the on board, 110 volt battery charging systems.

The disconnect shall be equipped with a NEMA 5-20 P male receptacle, which shall automatically eject the shoreline when the vehicle starter is energized. A label shall be provided indicating voltage and amperage ratings.

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SHORELINE POWER INLET PLATE

A shoreline power receptacle information plate shall be permanently affixed at or near the power inlet. The plate shall indicate the following:

- Type of Line Voltage
- Current Rating in Amps Power Inlet Type (DC or AC)

The Kussmaul auto-eject connection shall be equipped with a Red weatherproof cover.

The shoreline receptacle shall be located in the area directly adjacent to the driver's side cab door, above the side air grille.

BATTERY CHARGER SYSTEM

A Kussmaul Model #091-53-12-REMOTE, "Auto Charge 1200" high output, fully automatic battery charger shall be provided for maintaining the vehicle battery system. Unique electronic sensing circuits sense the true battery voltage while eliminating the need for external sense wires. Output current shall be 40 amperes @ 12 volt DC.

A LED bar graph display shall be located near the shoreline connection to monitor the battery status.

EMERGENCY SWITCHES

A switch control console shall be provided in the center dash panel between the driver's and officer's position. This console shall separate the emergency / auxiliary electrical functions from the regular chassis functions. Eight (8) Class One Model #SPS programmable touch pad type switches with integral indicator lights shall be provided.

A master switch shall be provided, which shall allow pre-setting of emergency light switch and shall have a red integral indicator light. A primary emergency lighting switch shall be provided, next to the master switch, along with a total of six (6) load manageable emergency switches. The last remaining switch shall be a ground light switch. All switches, (other than the master switch), shall have switch function labeling and an amber integral indicator light.

In addition to the standard switches, four (4) Class One Model #SPS programmable touch pad type switches with integral indicator lights shall be provided. All switches shall have switch function labeling and an amber integral indicator light.

"LED" CAB INTERIOR LIGHTING

Six (6) Whelen #700 interior LED combination red/white dome lights shall be furnished in the cab, two (2) in the forward section and four (4) in the rear crew section. Each dome light shall

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have an integral selector switch. Each dome light shall also activate when the respective, adjacent cab door is opened.

A shielded light shall be provided in each side opening, cab door step well. These lights shall activate with the respective door jamb switch.

"DO NOT MOVE APPARATUS" WARNING LIGHT WITH AUDIBLE ALARM

A red flashing warning light with an integral audible alarm, shall be functionally located in the cab to signal when an unsafe condition is present such as an open cab door or body compartment door, an extended ladder rack, a deployed stabilizer, an extended light tower or any other device which is opened, extended or deployed which may cause damage to the apparatus if it is moved.

This light shall be activated through the parking brake switch to signal when the parking brake is released. This light shall be labeled "DO NOT MOVE APPARATUS WHEN LIGHT IS ON".

CIGARETTE LIGHTER PORTS

Two (2) 12 volt cigarette lighter style accessory outlet(s) shall be installed in the cab of the truck for the Fire Departments accessory devices. The lighter(s) shall be located as directed in the cab for devices such as cellular phones.

SAFETY VISION CAMERA SYSTEM - (2) CAMERAS

A Safety Vision #SV-CLCD-65-620 rear vision camera system with audio shall be provided to allow the driver to visually see and hear at the rear and officer's side of the apparatus while in the cab. The system shall include a flat screen 6.8" color monitor, and two (2) color cameras with microphone and LED illuminators, that shall be mounted one (1) at the rear of the vehicle, and one (1) officer's side of the cab.

Cameras: Color SV-630 rear vision camera with microphone. 1/3 CCD imager, 4.3Mm Lens, 270,000 pixels, electronic shutter, LED illuminators, waterproof threaded pigtail.

Monitor: Color SV-LCD 68-KIT rear vision monitor. 6.8 LCD screen, speaker, audio and video adjustment controls, mirror/normal image switch, voltage 10VCD-26 VDC. The system shall also include a SV-LCD CB-PKKIT control box. Included cabling is the improved waterproof threaded metallic connector with rubber o-ring seal. Monitor only. 65' video cable, includes waterproof threaded connector at camera end.

NOTE: The system shall operate as follows:

- Rear view camera active when truck is in reverse.
- Side view camera active when right turn signal is active.

The rear view shall have precedent over the side view camera. The monitor viewing shall

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automatically follow the camera switching.

The monitor for the rear vision system shall be mounted ceiling of the cab in easy view of the driver.

HEADLIGHTS CLUSTER

Two (2) dual, rectangular, halogen headlight modules in bright finish bezels shall be furnished on the front of the cab. Each head light module shall incorporate an individual low beam and a high beam headlight. High beam actuation shall be controlled on the turn signal lever.

DAYTIME RUNNING LIGHTS

The chassis head lights shall have integrated circuitry to actuate the low beam headlights at a maximum of 80 percent of capacity whenever the chassis engine is running.

The daytime running lights shall be interlocked with the parking brake.

UPPER LIGHT MODULE

Two (2) Whelen 60R00FRR super LED flashing light heads shall be provided, one (1) in each side dual light module, above the headlights, in matching chrome plated bezels. The color shall be red unless otherwise specified.

An individual control switch shall be provided on the cab switch console, which shall be wired through the load management system to prevent excessive amperage draw.

The lights noted above shall be provided in addition to the NFPA required, minimum optical warning light package.

The NFPA required, Zone "A" lower warning lights shall be incorporated into each side dual light module noted above.

ARROW TURN SIGNALS

Two (2) Whelen Series 700 arrow shaped, amber LED turn signals shall be provided in chrome plated housings, mounted one (1) each side between the windshield and the dual light modules.

Two (2) surface mounted Whelen 60F000RR 60 watt halogen flashing light heads shall be furnished and shall be mounted one (1) each side at the front cab corners to act as additional turn signal indicators. The light heads shall be equipped with amber lenses and a chrome plated flange (6EFLANGE).

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Two (2) surface mounted Whelen 580CAARR 60 watt halogen light heads shall be furnished and shall be mounted one (1) each side on the front bumper extension to act as side illumination on turns and shall operate automatically with the appropriate turn signal. The light heads shall be equipped with clear lenses and a chrome plated flange (508TRIM).

DOT MARKER LIGHTS AND REFLECTORS

Five (5) DOT approved Whelen (or equal) Light Emitting Diode (LED) cab marker lamps shall be mounted on the top front edge of the cab roof.

Truck-Lite Model 18 amber LED marker lights/auxiliary turn signals with integral reflectors shall be provided on the side of the cab above the front wheel well, one (1) each side.

Truck-Lite Model #18 red LED marker lights with integral reflectors shall be provided at the lower side rear, one (1) each side.

Truck-Lite #60115Y yellow LED side marker and turn lights shall be provided on the apparatus lower side, forward of rear axle, one (1) each side.

Truck-Lite Model #19 red LED clearance lights shall be provided on the apparatus rear upper, one (1) each side at the outermost practical location.

Truck-Lite Model #33740R LED 3-lamp identification bar will be provided on the apparatus rear center. The lights shall be red in color.

Truck-Lite #98034Y yellow reflectors shall be provided on the apparatus body lower side, as far forward and low as practical, one (1) each side if the apparatus is 30' long or longer.

Truck-Lite #98034R red reflectors shall be provided on the apparatus rear, one (1) each side at the outermost practical location.

LICENSE PLATE LIGHT

One (1) license plate light and bracket shall be provided at the mounting position of the license plate. The light shall be clear in color.

TAIL, STOP, TURN AND BACK-UP LIGHTS

Two (2) Whelen 600 series, 4-1/8" x 6-1/2", LED red combination tail and stop lights, shall be mounted one each side at the rear of the body.

Two (2) Whelen 600 series, 4-1/8" x 6-1/2", LED amber arrow turn signal lights, shall be mounted

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one each side, on a vertical plane with the tail/stop lights.

Two (2) Whelen 600 series, 4-1/8" x 6-1/2", LED white back-up lights, shall be mounted one each side on a vertical plane with the turn/tail/stop signals. These lights shall activate when the transmission is placed in reverse gear.

Two (2) Whelen PLAST4V mounting flanges, installed one (1) on each side, shall be provided to mount the lights described above in one common mounting flange. The fourth opening shall be for the lower rear warning lights.

REAR BUZZER BUTTONS

Two (2) rear buzzer buttons shall be provided on the rear body panels (one (1) each side) to activate a buzzer in the cab. The buttons shall be labeled: 1-stop; 2-go; and 3-back-up. The buttons shall be mounted no higher than 36" above ground level, to be utilized from ground level only.

STEP LIGHTS

Chrome plated, shielded chassis and body step lights shall be provided and controlled with marker light actuation. Step lights shall be located to properly illuminate all body and chassis access steps and walkway areas.

RUNNING BOARD STEP LIGHTS

Two (2) 4" recessed step lights shall be provided in the lower front face of the body near each side running board step, one (1) each side. The lights shall be located a minimum of 6" from the running board step and shall be activated by a control switch located on the pump operator's panel.

DUNNAGE AREA LIGHTING

Two (2) step lights shall be provided in the dunnage area to provide adequate illumination of this area.

DECK LIGHTS / WORK LIGHTS

Two (2) 6" Unity model AG chrome plated deck lights shall be provided and mounted on the rear stanchions, one (1) each side. Each individual deck light shall be controlled by an individual switch mounted on each light, as well as by a single master switch in the master warning switch console.

The deck lights shall also serve as rear work lights to illuminate the rear of the apparatus to meet NFPA-1901 requirements.

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GROUND LIGHTS - CAB

One (1) rubber mounted halogen ground light shall be provided under each side cab door entrance step, four (4) total. The ground lights shall turn on automatically with each respective door jamb switch and also by a master ground light switch in the warning light switch console.

Each light shall illuminate an area at a minimum 30" outward from the edge of the vehicle. The rear crew door ground lights shall be positioned at an angle rearward to provide illumination at the pump panel and the front of the body work areas.

GROUND LIGHTS - FRONT BODY

One (1) rubber mounted halogen ground light shall be provided under each front body corner, two (2) total. The ground lights shall be activated by a master ground light switch in the cab and shall be wired through the load management system.

GROUND LIGHTS - REAR

One (1) rubber mounted halogen ground light shall be provided under each rear body corner, two (2) total. The ground lights shall be activated by a master ground light switch in the cab and shall be wired through the load management system.

ROOF MOUNT 150 WATT HID FLOODLIGHT - ABOVE WINDSHIELD

A Fire Research Optimum Model OPA800-HD15 contour roof mount light shall be installed. The mounting brackets shall attach to the bottom of the lamp head and be machined to conform to the roof radius. Wiring shall extend from a weatherproof strain relief at the rear of the lamp head.

The lamp head shall have one (1) High Intensity Discharge (HID) 150 watt 12 volt bulb. The bulb shall draw 12.5 amps and generate 11,250 lumens. The bulb shall be accessible through the front. The lamp head shall incorporate a vacuum deposit polished reflector and two optimizing mirrors to produce a uniform beam that lights up an area 100° vertically by 150° horizontally. The lamp head shall have a heat dissipating curved front lens. The curve of the lens shall have a radius of 5.16 inches to optimize light emission. The lamp head shall be no more than 5 3/4" deep by 5 1/8" high by 8 3/4" wide. Lamp head and brackets shall be powder coated white.

The Optimum brow mounted flood light shall be located above the windshield in the center of the cab.

LIGHT ABOVE WINDSHIELD MASTER POWER SWITCH

A master power switch shall be provided in the cab warning light switch console to turn the light

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above windshield on and off.

12 VOLT BODY ELECTRICAL SYSTEM

All electrical lines in the body shall be protected by automatic circuit breakers, conveniently located to permit ease of service. Flashers, heavy solenoids and other major electrical controls shall be located in a central area near the circuit breakers.

All lines shall be color and function coded every 3", easy to identify, oversized for the intended loads and installed in accordance with a detailed diagram. A complete wiring diagram shall be supplied with the apparatus.

Wiring shall be carefully protected from weather elements and snagging. Heavy duty loom shall be used for the entire length. Grommets shall be utilized where wiring passes through panels.

In order to minimize the risk of heat damage, wires run in the engine compartment area shall be carefully installed and suitably protected by the installation of heat resistant shielded loom.

All electrical equipment shall be installed to conform to the latest federal standards as outlined in NFPA 1901.

BODY ELECTRICAL JUNCTION COMPARTMENT

A weather resistant electric junction compartment shall be provided in the left side lower front compartment. This compartment shall be recessed through the inside rear wall of the compartment to provide an easily accessible enclosure to house all of the body wiring junction points, terminal strips, solenoids, etc. The design of this compartment shall not decrease the storage capacity area of the compartment in which it is located. A removable panel shall be provided for access to this compartment.

PUMP ENCLOSURE WORK LIGHTS

Work lighting shall be provided inside the pump enclosure providing a minimum of 20 candlepower illumination.

ENGINE COMPARTMENT WORK LIGHTS

Two (2) work lights shall be provided inside the engine enclosure that will provide a minimum of 20 candlepower illumination.

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ROM TRACK MOUNTED COMPARTMENT LIGHTS

Each individual, equipment storage compartment shall be equipped with ROM LED V2 track mounted light fixture on the forward and rear edge of each body door opening. The track mounted light fixture shall be mounted directly to the roll up door mounting track, projecting light toward the compartment interior. The LED light fixtures can positioned independently or added where desired. Any LED can easily be replaced without removing track or adjacent LED's. The lights shall be protected by a full length polycarbonate lens. (No Exceptions)

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NFPA LIGHTING PACKAGE

The following warning light package shall include all of the minimum warning light and actuation requirements for the current revision of the NFPA 1901 Fire Apparatus Standard. The lighting as specified shall meet the requirements for both "Clearing Right of Way" and "Blocking Right of Way" as noted.

LIGHT PACKAGE ACTUATION CONTROLS

The entire warning light package shall be actuated with a single warning light switch located on the cab switch panel. The wiring for the warning light package shall engage all of the lights required for "Clearing Right of Way" mode when the vehicle parking brake is not engaged. An automatic control system shall be provided to switch the warning lights to the "Blocking Right of Way" mode when the vehicle parking brake is engaged.

UPPER LEVEL LIGHTING - WHELEN NFPA ZONE A, UPPER

A Whelen #FN72VLED "Edge Freedom", 72" LED cab roof warning lightbar shall be furnished and rigidly mounted on top of the cab roof. The lightbar shall be equipped with the following:

- Four Corner Red Linear LED's
- Two Red Forward Facing Linear LED's
- Two White Forward Facing Linear LED's

The forward facing clear LED flashers shall be disabled automatically for the "Blocking Right of Way" mode.

The Freedom light bar shall be equipped with a #9592 3M Opticom emitter. The Opticom emitter shall be disabled automatically for the "Blocking Right of Way" mode.

NFPA ZONE C, UPPER

Two (2) Whelen RB6 series rotating halogen beacon lights shall be mounted one (1) each side at the rear of the body. An RB6TRP red light shall be provided on the left side and an RB6TAP amber light shall be provided on the right side.

NFPA ZONES B & D REAR, UPPER

The lighting requirement for this area is covered by the lights noted in Zone "C" - Upper.

NFPA ZONES B & D FRONT, UPPER

The lighting requirement for this area is covered by the lights noted in Zone "A" - Upper.

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LOWER LEVEL LIGHTING - WHELEN NFPA ZONE A, LOWER

Two (2) Whelen #60R02FRR linear super LED light heads shall be provided and installed one (1) each side. The lights shall be equipped with red lenses and a chrome plated mounting flange.

The lower zone A warning lights shall be mounted in the custom chassis headlight bezels.

NFPA ZONE C, LOWER

Two (2) Whelen #60R02FRR linear LED light heads shall be provided and installed one (1) each side directly below the DOT stop, tail, turn and backup lights. The lights shall be equipped with red lenses and a chrome plated mounting flange.

NFPA ZONES B & D FRONT, LOWER

Two (2) Whelen #60R02FRR linear super LED light heads shall be provided and installed one (1) each side. The lights shall be equipped with red lenses and a chrome plated mounting flange.

The lower zone B & D warning lights shall be mounted on the sides of the custom chassis front bumper.

NFPA ZONES B & D MIDSHIP, LOWER

Two (2) Whelen #60R02FRR linear super LED light heads shall be provided and installed one (1) each side. The lights shall be equipped with red lenses and a chrome plated mounting flange.

NFPA ZONES B & D REAR, LOWER

Two (2) Whelen #60R02FRR linear super LED light heads shall be provided and installed one (1) each side. The lights shall be equipped with red lenses and a chrome plated mounting flange.

WARNING LIGHT SYSTEM CERTIFICATION

The warning light system(s) specified above shall not exceed a combined total amperage draw of 45 AMPS with all lights activated in either the "Clearing Right of Way" or the "Blocking Right of Way" mode.

The warning light system(s) shall be certified by the light system manufacturer(s), to meet all of the requirements in the current revision of the NFPA 1901 Fire Apparatus Standard as noted in the General Requirements section of these specifications. The NFPA required "Certificate of Compliance" shall be provided with the completed apparatus.

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ALTERNATING FLASHING HEADLIGHT SYSTEM

An alternating flashing wig-wag system, wired to the apparatus headlights, shall be installed. The wig-wag system shall be individually switched at the master light console and wired through the load management system to be shut down when load management is required. The alternating flashing system shall be automatically disabled during the "Blocking Right of Way" mode.

AUXILIARY WARNING LIGHTS

Two (2) surface mounted Whelen #50R03ZRR TIR-6 LED light heads shall be furnished and shall be mounted one (1) each side in the vicinity of the side engine air flow grilles. The lights shall be equipped with red lenses and #5TSMAC, flush mount, chrome plated mounting flanges.

Two (2) surface mounted Whelen 60R00FRR LED flashing light heads shall be furnished and shall be mounted one (1) each side above the rear body running light cluster. The light heads shall be equipped with red lenses and a chrome plated flange (6EFLANGE).

Two (2) surface mounted Whelen 60R00FRR LED flashing light heads shall be furnished and be mounted one (1) each side on the front of the front bumper. The light heads shall be equipped with red lenses and a chrome plated flange (6EFLANGE).

The lights specified above shall be provided in addition to the NFPA required Optical Warning Light Package and shall be switched independently from the light package. Additionally, wiring for the independently switched lights specified, shall be run through the Load Management System to ensure that the electrical system is not overloaded by the additional amperage draw requirements.

ROOF MOUNTED LIGHT BARS

A pair of Whelen Model FNMINI, 24", cab roof warning light bars shall be furnished and rigidly mounted, one (1) at each side on the cab roof facing to each side of the unit. Each light bar shall be equipped with two (2) red corner LED's, one (1) forward facing LED and one (1) side facing LED. All the lenses shall be **clear**.

The lights specified above shall be provided in addition to the NFPA required Optical Warning Light Package and shall be switched independently from the light package. Additionally, wiring for the independently switched lights specified, shall be run through the Load Management System to ensure that the electrical system is not overloaded by the additional amperage draw requirements.

WARNING LIGHT

A Roto-Ray Model #200 rotating, three (3) light, warning light shall be installed on the front of the cab below the windshield. The Roto-Ray light shall have three sealed beam lights that shall and rotate at 200 rpm in a vertical plane. **Two (2) red and one (1) white light shall be provided.**

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The lights specified above shall be provided in addition to the NFPA required Optical Warning Light Package and shall be switched independently from the light package. Additionally, wiring for the independently switched lights specified, shall be run through the Load Management System to ensure that the electrical system is not overloaded by the additional amperage draw requirements.

TRAFFIC ADVISER WARNING LIGHT

One (1) Whelen "Traffic Advisor", Model TA837L, 44" rear directional light shall be installed on the vertical rear surface of the body. The light shall be equipped with eight (8) lamps. The directional light shall be activated by a control module. The control module shall be conveniently located near the driver's position. The rear directional light shall be wired through the load management system of the unit.

ELECTRIC HORNS

Dual **Wolo Xtreme** electric horns activated by the steering wheel horn button shall be furnished.

BACK-UP ALARM

A Code 3, Model #D50C, solid state back-up alarm shall be provided and installed at the rear of the apparatus under the tailboard. The back-up alarm shall activate automatically when the transmission is placed in reverse gear and the ignition is "on".

AIR HORNS

Two (2) Grover 24" chrome plated air horns shall be at the front of the vehicle. The air horns shall be mounted in full compliance with NFPA-1901. A 3/8" minimum air line "teed" with equal distance from each horn shall be installed with a pressure protection valve.

Both air horns shall be recessed in the front bumper.

The air horn(s) shall be controlled by a foot switch on the officer's side and the steering horn button on driver's side. An air horn/standard horn selector switch shall be furnished on the dash for the drivers steering horn button.

ELECTRONIC SIREN

One (1) Power Call Model 6-Adam 200 watt electronic siren shall be provided featuring: electronic air horn, wail, yelp, powercall, 6 adam and hyperyelp siren tones. A hardwired microphone shall provided for the public address feature.

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The electronic siren and speaker shall meet the NFPA required SAE certification to ensure compatibility between the siren and speaker.

Two (2) Powercall, Model #GM-60 siren speakers shall be provided, recessed in the front bumper and wired to the electronic siren.

The electronic siren control shall be equipped with a Johnny Ray model #JR-400 low-profile swivel mount that shall allow the siren control unit to be turned 180 degrees toward the officer or the driver.

FEDERAL Q2B MECHANICAL SIREN

One (1) Federal Model #Q2B mechanical siren shall be provided to provide audible warning.

The Q2B siren shall be wired through the load management system to prevent excessive amperage draw. The siren shall be provided in addition to the required minimum NFPA audible warning requirements.

The Q2-B siren shall be pedestal mounted on top of the extended bumper on the driver's side. The siren shall be equipped with a Federal model #P, chrome housing and pedestal.

Two (2) Linemaster #632 floor mounted foot switches shall be provided, one (1) for the officer and one (1) for the driver. A siren brake button shall be provided near the driver's position.

DAVID CLARK MODEL #3800 INTERCOM SYSTEM

A David Clark Model 3800 intercom system shall be provided in the front & rear of the cab. The system shall be capable of interfacing with a two-way radio system (note: an authorized two-way radio installer shall be responsible for interfacing the intercom system with the two-way radio).

The intercom system shall include:

DRIVERS AND OFFICERS HEADSETS FOR DAVID CLARK SYSTEM

Two (2) single-plug under helmet radio transmit headsets shall be furnished for the driver and officer seating locations in the cab. The driver headset shall be a H3441 and the officers shall be a H3442. The intercom headsets shall have adjustable volume, noise-canceling electric microphone, adjustable head strap, and a flex-style boom which rotates for left or right placement. The sets shall also have comfortable gel ear seals.

One (1) weather cap shall be furnished to protect the pump panel connection from the elements.

One (1) C3019 utility radio adapter shall be furnished to allow the driver or officer's headset to be plugged into the pump panel.

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REAR JUMPSEAT HEADSETS

Four (4) H3442 single-plug under helmet radio transmit headsets shall be furnished for **four (4)** forward facing seating locations in the cab.

The intercom headsets shall have adjustable volume, noise-canceling electric microphone, adjustable head strap, and a flex-style boom, which rotates for left or right placement. The sets shall also have comfortable gel ear seals.

WEATHER BAND AM/FM/CD RADIO

A Panasonic Weather Band/AM/FM radio with CD player shall be installed in the cab overhead panel as space allows. The speakers shall be located as follows:

- (2) Located in the Front of the cab
- (2) Located in the Rear of the cab

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PUMP

- **WATEROUS CMU-C10**
- **1500 G.P.M.**
- **TWO-STAGE**

The pump shall be of two-stage construction and shall comply with all applicable requirements of the latest standards for automotive fire apparatus of the National Fire Protection Association, NFPA-1901 and shall have a rated capacity of 1500 gpm.

The pump must deliver the percentage of rated capacity at the pressure listed below:

- 100% of rated capacity at 150 P.S.I. net pump pressure
- 100% of rated capacity at 165 P.S.I. net pump pressure
- 70% of rated capacity at 200 P.S.I. net pump pressure
- 50% of rated capacity at 250 P.S.I. net pump pressure

When dry, the pump shall be capable of taking suction and discharge water with a lift of 10 feet in not more than 30 seconds through 20 feet of appropriate size suction hose.

The pump shall be free from objectionable pulsation and vibration under all normal operating conditions.

PUMP CONSTRUCTION

The pump body shall be close-grained gray iron and must be horizontally split in two sections for easy removal of the impeller shaft assembly, and designed for complete servicing from the bottom of the truck without disturbing setting of the pump in the chassis or apparatus piping which is connected to the pump. Pump body halves shall be bolted together on a single horizontal face to minimize chance of leakage and facilitate reassemble.

Discharge manifold shall be cast as an integral part of the pump body assembly and shall provide at least three full 3-1/2 inch openings for ultimate flexibility in providing various discharge outlets for maximum efficiency, and shall be located as follows: one outlet on the right side of the pump body, one outlet on the left side of the pump body, and one outlet on top of the pump discharge manifold.

IMPELLER SHAFT

Impeller shaft shall be stainless steel, accurately ground to size, and supported at each end by oil or grease lubricated, anti-friction bearings for rigid and precise support. Bearings shall be protected from water and sediment by suitable stuffing boxes, flinger rings and oil seals. The impeller shaft shall be of two-piece construction separable between the pump and pump transmission to allow true separation of the transmission from the pump without disassembly of either component. No sleeve type bearings shall be used.

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TRANSFER VALVE

Transfer valve design shall be of latest ball type, of all bronze construction and incorporate a hydraulically balanced seal assembly to minimize leakage around the ball and assure maximum pump efficiency. The transfer valve shall operate smoothly and without sticking even when exposed to sandy or dirty water.

The transfer valve actuator shall be operated manually by means of a push/pull control handle mounted on the operator's panel. Operation of the transfer valve shall provide smooth changing of the transfer valve to either PRESSURE or VOLUME without shutting down, at any discharge pressure up to 250 psi.

PUMP PACKING

Stuffing boxes shall be equipped with two-piece glands to permit adjustment or replacement of packing without disturbing the pump. Lantern rings shall be located at the inner end of the stuffing boxes the all ring can be removed without removal of the lantern rings. Water shall be fed into the stuffing box lantern rings for proper lubrication and cooling when the pump is operating.

PUMP IMPELLERS

Impellers shall be bronze, accurately balanced (mechanically and hydraulically), of mixed flow design with reverse flow labyrinth-type wear rings that resist water bypass and loss of efficiency due to wear. The impellers shall have flame plated hubs to assure maximum pump life and efficiency despite the presence of abrasive particles, such as fine sand, in the water being pumped.

Wear rings shall be bronze, and shall be easily replaceable to restore original pump efficiency and eliminate the need for replacing the entire pump casing due to wear.

PUMP TRANSMISSION

The pump transmission shall be an all aluminum "C10" model, rigidly attached to the pump body assembly and be of latest design incorporating a high strength involute tooth-form Hy-Vo chain drive. The driven sprockets shall be capable of operating at high speeds to provide smooth, quiet transfer of power. The shift engagement shall be accomplished by a free-sliding collar and shall incorporate an internal locking mechanism to insure that the collar shall be maintained in ROAD or PUMP position.

PUMP RATIO

The pump ratio shall be selected by the apparatus manufacturer to give maximum performance with the engine and transmission selected.

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The manufacturer shall supply at time of delivery copies of the pump manufacturer's certification of hydrostatic testing, the engine manufacturer's current certified brake horsepower curve.

PUMP SHIFT

The pump shift shall be pneumatically operated and shall incorporate a standard automotive air valve shifting mechanism for ease of maintenance and parts availability. The pump shift valve shall be mounted in the cab and identified as **PUMP SHIFT**, and include shift instructions permanently inscribed on the pump shift switch plate. The in cab control valve shall include a detent lock to prevent accidental shifting.

EMERGENCY PUMP SHIFT

An emergency manual pump shift control shall be furnished on the left side pump panel which may be utilized if the air shift control does not operate.

A transmission, manual lock-up switch shall be furnished in the cab to ensure positive lock-up of the transmission.

PUMP SHIFT INDICATORS LIGHT

The pump shift assembly shall incorporate an indicating light system which shall warn the operator if the shift to PUMP has not been completed and indicate when it has been completed. The switch that activates the lights must be mounted on the pump transmission and positioned so that the pump shift arm activates the switch only when the shift arm has completed its full travel into **PUMP** position.

TRANSMISSION LOCK

The automatic transmission furnished in the chassis shall have a lock-up assembly which brings the transmission to direct drive and prevents the transmission from shifting gears while in the pumping mode.

BRAKING SYSTEM

A positive braking system shall be provided to prevent vehicle movement during pumping operations. The air brakes furnished must satisfy this requirement.

PUMP MOUNTS

Extra heavy duty pump mounting brackets shall be furnished. These shall be bolted to the frame

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rails in such a position to perfectly align the pump so that the angular velocity of the drive line joints shall be the same on each end of the drive shaft. This shall assure full capacity performance with a minimum of vibration. Mounting hardware shall utilize Grade 8 bolts.

Pumps which are not mounted directly to the frame will not be considered. Under no circumstance shall the pump function as a frame cross member.

FIRE RESEARCH "IN-CONTROL" PRESSURE GOVERNOR

The apparatus shall be equipped with a Fire Research InControl series TGA400 pressure governor and monitoring display kit shall be installed. The kit shall include a control module, intake pressure sensor, discharge pressure sensor, and cables. The control module case shall be waterproof and have dimensions not to exceed 5 1/2" high by 10 1/2" wide by 2" deep. The control knob shall be 2" in diameter with no mechanical stops, have a serrated grip, and a red idle push button in the center. It shall not extend more than 1 3/4" from the front of the control module. Inputs for monitored information shall be from a J1939 databus or independent sensors. Outputs for engine control shall be on the J1939 databus or engine specific wiring.

The following continuous displays shall be provided:

- Pump discharge; shown with four daylight bright LED digits more than 1/2" high
- Pump Intake; shown with four daylight bright LED digits more than 1/2" high
- Pressure / RPM setting; shown on a dot matrix message display
- Pressure and RPM operating mode LEDs
- Throttle ready LED
- Engine RPM; shown with four daylight bright LED digits more than 1/2" high
- Check engine and stop engine warning LEDs
- Oil pressure; shown on a dual color (green/red) LED bar graph display
- Engine coolant temperature; shown on a dual color (green/red) LED bar graph display
- Transmission Temperature: shown on a dual color (green/red) LED bar graph display
- Battery voltage; shown on a dual color (green/red) LED bar graph display.
- The dot-matrix message display shall show diagnostic and warning messages as they occur. It shall show monitored apparatus information, stored data, and program options when selected by the operator. All LED intensity shall be automatically adjusted for day and night time operation.

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

- High Battery Voltage
- Low Battery Voltage (Engine Off)
- Low Battery Voltage (Engine Running)
- High Transmission Temperature
- Low Engine Oil Pressure

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- High Engine Coolant Temperature
- Out of Water (visual alarm only)
- No Engine Response (visual alarm only).

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

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

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

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

AKRON INTAKE RELIEF VALVE

An Akron Model 59 intake relief valve system shall be plumbed on the suction side of the pump to comply fully with NFPA-1901 requirements. Excess pressures shall be plumbed to discharge water under the pump enclosure away from the pump operator.

An additional primer control valve shall be furnished, piped directly to the front/ rear suction line piping. The priming valve shall activate the standard pump primer to minimize pump cavitation during remote suction operations and shall be located on the pump operator's panel.

PRIMING PUMP

The priming pump will be a Trident # 31.001.2 air primer system. A push in primer handle will open the priming valve and prime the pump.

MASTER DRAIN

The Waterous manifold drain assembly shall consist of a stainless steel plunger in a bronze body with multiple ports. The valve shall be designed so that pump discharge pressure prevents it from opening

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accidentally. The drain valve control shall be panel mounted, cable or rod operated and identified PUMP DRAIN.

INDIVIDUAL BLEEDERS AND DRAINS

All lines shall drain through the master drain valve or shall be equipped with individual drain valves, easily accessible and labeled.

One (1) individual "CLASS ONE" quarter turn drain valve shall be furnished for each 1-1/2" or larger discharge port and each 2-1/2" gated auxiliary suction.

Drain/bleeder valves shall be located at the bottom of the side pump module panels.

All drains and bleeders shall discharge below the running boards.

SYNFLEX PRESSURE LINES

All lines in the pump enclosure and plumbing shall be Synflex hose.

ANODE BLOCKS

Four (4) Watrous anode blocks shall be provided in the pump manifold to protect the pump from corrosion. A bolt in anode block shall be provided in the suction and discharge side of the pump manifold.

The Anodes shall be painted Safety Yellow for identification purposes.

PUMP OVERHEAT INDICATOR SYSTEM

A Watrous Overheat Protection Manager (OPM) shall be provided to serve as a safety device by releasing hot water from the discharge area of the pump to the ground or back to a water tank. The OPM consists of a valve that opens when the water in the pump reaches 140_F (60_C) and a warning light that is triggered by a thermal switch when the water in the pump reaches 180_F (82_C). The warning light acts as an additional protection device if the temperature inside the pump keeps rising although the valve is open. The OPM valve and switch are both mounted on two 1/2" tapped holes located near the center discharge area of the pump.

PUMP MODULE

The pump module shall be a self-supported structure mounted independently from the body and chassis cab. The design must allow normal frame deflection without imposing stress on the pump module

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structure or side running boards. The pump module shall be securely mounted to the chassis frame rails.

The pump module shall be a welded frame work utilizing structural steel components properly braced to withstand the rigors of chassis frame flex.

DUNNAGE AREA

A dunnage area shall be provided above the pump enclosure for equipment mounting and storage. This area shall be furnished with a removable 3/16" aluminum tread plate floor and side panels.

NOTE: The size of this storage area may vary when top mounted crosslays, booster reel(s), etc., are specified and located in this area.

SUCTION INLETS

Two (2) 6" N.S.T. suction inlets shall be provided, one on the left pump panel and one on the right pump panel. A removable strainer shall be installed on each inlet.

PUMP SUCTION ENDS

The main pump suction inlets shall be furnished with a short suction end, terminating with only the suction threads protruding through the side panel to minimize the distance an exterior appliance protrudes beyond the pump panel.

A 6" NST chrome plated long handle pressure vented cap shall be installed on each.

FRONT SUCTION

A 6" N.S.T. front suction inlet shall be provided at the front of the vehicle, plumbed from the pump.

The front inlet shall be located above the right hand side of the front bumper extension and shall terminate with a chromed brass, chicksan style swivel to allow a minimum of 180 degree rotation of the inlet for suction hose attachment.

The front suction pipe shall be equipped with a chrome 6" NSTM thread adapter.

The front inlet shall be plumbed utilizing 5", 10 gauge stainless steel pipe, 45 degree weld elbows and a limited number of 90 degree sweep elbows in a welded assembly from the pump to the front of the cab.

A minimum of two (2) Victaulic couplings shall be furnished in this assembly to allow for flex and

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serviceability.

The front suction plumbing shall be fitted with a 5" Hale Master Intake Valve (MIV), on the front suction inlet. The valve shall be in the pump enclosure area with a manual override located directly on the valve actuator. The valve shall have a bore of 6.40". The valve body and all related components that are in contact with water shall be manufactured of fine grained, corrosion resistant bronze.

The valve housing shall incorporate a pressure relief valve, set at the pump manufacturers facility to a rating of 125 PSI. The pressure relief valve shall provide protection for the suction hose even with the valve in the closed position. The valve shall incorporate a NFPA compliance, large diameter hose air bleed valve, controlled at the operator's panel.

The front suction valve shall be operated by a twelve (12) volt DC motor, controlled from the pump operator's panel. It shall also incorporate a hand wheel control manual override, mounted at the suction inlet. The electric control shall incorporate a placard with status lights to indicate whether the valve is in the closed, open or throttled position. The valve shall not be able to move from fully open to fully closed in under three (3) seconds, in compliance with NFPA-1901.

A 6" NST chrome plated long handle vented cap shall be installed on front suction.

AUXILIARY SIDE SUCTION(S)

One (1) 2-1/2" auxiliary suction shall be provided at the driver side pump panel, to the front of the main inlet. The 2-1/2" auxiliary suction shall terminate with a removable strainer, chrome plated 2-1/2" NST female swivel with a chrome plated plug and retaining chain.

A 2 1/2" Akron #8800 series full flow, stainless steel ball valve shall be provided for the driver side front auxiliary suction.

A 1/4 turn swing control handle shall be provided on the driver side front auxiliary suction valve

One (1) 2-1/2" auxiliary suction shall be provided at the officer's side pump panel, to the front of the main inlet. The 2-1/2" auxiliary suction shall terminate with a removable strainer, chrome plated 2-1/2" NST female swivel with a chrome plated plug and retaining chain.

A 2 1/2" Akron #8800 series full flow, stainless steel ball valve shall be provided for the officer side front auxiliary suction.

A 1/4 turn swing control handle shall be provided on the officer's side front auxiliary suction valve

All side gated inlet valves shall be recess mounted behind the side pump panels or body panels.
(No Exceptions)

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TANK TO PUMP

One (1) 4" tank to pump line shall be piped through the front bulkhead of the tank with a 90 degree elbow down into the tank sump. This line shall be plumbed directly into the rear of the pump suction manifold for maximum efficiency.

A check valve shall be provided to prevent accidental pressurization of the water tank through the pump connection. Connection from the valve to the tank shall be made by using a non-collapsible flexible rubber hose.

A 3" Akron #8800 series full flow, stainless steel ball valve shall be provided between the pump suction manifold and the water tank.

A push/pull control handle shall be located on the operator's panel with function plate.

TANK FILL

One (1) 2" gated full flow pump to tank refill line controlled at the pump panel shall be provided. A deflector shield inside the tank shall be furnished. Tank fill plumbing shall utilize 2" high pressure hose for tank connection to accommodate flexing between components. (NO EXCEPTIONS)

A 2" Akron, #8800 series, full flow, stainless steel ball valve shall be provided between the pump discharge manifold and the water tank.

A push/pull control handle shall be located on the operator's panel with function plate.

DRIVER'S SIDE MAIN DISCHARGE #1

A discharge shall be provided and located at the driver's side pump panel. The driver's side discharges #1 shall terminate with NST threads, through the left panel above the main pump intake.

The main pump discharge shall be plumbed directly from the pump discharge manifold utilizing direct connect discharge valve flanges.

A 2 1/2" Waterous full flow, ball valve shall be provided for the driver's side #1 discharge.

The discharge valve shall be equipped with a straight 2 1/2" NST adapter that shall be equipped with a 2 1/2" NST, 30-degree, chrome plated elbow.

A 2-1/2" NSTF X 1-1/2" NSTM reducer w/cap shall be provided on the driver's side #1 discharge.

The driver's side #1 discharge valve shall be controlled by a rack and sector with push/pull handle located on the operator's panel.

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FIRE RESEARCH FLOWMETER

The driver's side #1 discharge shall be equipped with a Fire Research "Insight" Ultimate Flow/Pressure Meter, which shall give the operator or engineer an indication of actual volume of water (in gallons) being discharged through the specified line. The display shall also be capable of showing discharge pressure without the need of pushing any buttons.

A analog/digital display shall be mounted on the pump panel in place of a standard pressure gauge. The waterproof display case shall be constructed of aluminum, with bright red LCD digits to indicate flow, and a bright analog pointer to indicate pressure.

A flow sensor paddle wheel shall be installed on the discharge piping with a machined housing or clamp.

A pressure transmitter (transducer) shall be mounted in the discharge piping to indicate pressure only when the valve is open.

OFFICER'S SIDE MAIN DISCHARGE #1

A discharge shall be provided and located at the officer's side pump panel. The officer's side discharges #1 shall terminate with NST threads, through the officer's side panel above the main pump intake.

The main pump discharge shall be plumbed directly from the pump discharge manifold utilizing direct connect discharge valve flanges.

A 4" Akron, #8840 series, full flow, flat ball valve shall be provided for the officer's side #1 discharge.

The discharge valve shall be equipped with a straight 4" NST adapter that shall be equipped with a 4" NST, 30-degree, chrome plated elbow.

A 4" NSTF X 5" Storz Kocheck S37S straight adapter w/cap shall be provided on the officer's side #1 discharge.

The officer's side #1 discharge valve shall be equipped with an Akron Model # 9303 electric valve control on the operator's panel with function plate. The electric control shall be of current limiting design, requiring no clutches in the motor. The control shall be equipped with momentary open and close booted switches to operate actuator. The bezel and case shall be brass material. To indicate the position of the valve, the controllers must have individual red, yellow and green long life LED's with light pipes for maximum visibility.

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FIRE RESEARCH FLOWMETER

The officer's side #1 discharge shall be equipped with a Fire Research "Insight" Ultimate Flow/Pressure Meter, which shall give the operator or engineer an indication of actual volume of water (in gallons) being discharged through the specified line. The display shall also be capable of showing discharge pressure without the need of pushing any buttons.

A analog/digital display shall be mounted on the pump panel in place of a standard pressure gauge. The waterproof display case shall be constructed of aluminum, with bright red LCD digits to indicate flow, and a bright analog pointer to indicate pressure.

A flow sensor paddle wheel shall be installed on the discharge piping with a machined housing or clamp.

A pressure transmitter (transducer) shall be mounted in the discharge piping to indicate pressure only when the valve is open.

OFFICER'S SIDE MAIN DISCHARGE #2

A discharge shall be provided and located at the officer's side pump panel. The officer's side discharges #2 shall terminate with NST threads, through the officer's side panel above the main pump intake.

The main pump discharge shall be plumbed directly from the pump discharge manifold utilizing direct connect discharge valve flanges.

A 4" Akron, #8840 series, full flow, flat ball valve shall be provided for the officer's side #3 discharge.

The discharge valve shall be equipped with a straight 4" NST adapter that shall be equipped with a 4" NST, 30-degree, chrome plated elbow.

A 4" NSTF X 5" Storz Kocheck S37S straight adapter w/cap shall be provided on the officer's side #3 discharge.

The officer's side #2 discharge valve shall be equipped with an Akron Model # 9303 electric valve control on the operator's panel with function plate. The electric control shall be of current limiting design, requiring no clutches in the motor. The control shall be equipped with momentary open and close booted switches to operate actuator. The bezel and case shall be brass material. To indicate the position of the valve, the controllers must have individual red, yellow and green long life LED's with light pipes for maximum visibility.

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FIRE RESEARCH FLOWMETER

The officer's side #3 discharge shall be equipped with a Fire Research "Insight" Ultimate Flow/Pressure Meter, which shall give the operator or engineer an indication of actual volume of water (in gallons) being discharged through the specified line. The display shall also be capable of showing discharge pressure without the need of pushing any buttons.

A analog/digital display shall be mounted on the pump panel in place of a standard pressure gauge. The waterproof display case shall be constructed of aluminum, with bright red LCD digits to indicate flow, and a bright analog pointer to indicate pressure.

A flow sensor paddle wheel shall be installed on the discharge piping with a machined housing or clamp.

A pressure transmitter (transducer) shall be mounted in the discharge piping to indicate pressure only when the valve is open.

DRIVER SIDE REAR DISCHARGE

A 2 1/2" NST rear discharge shall be provided at the rear of the vehicle, plumbed from the pump.

The rear discharge shall terminate on the rear body panel, on the driver side of the body.

The driver side rear discharge pipe shall be equipped with a chrome 2 1/2" NSTM thread adapter.

The driver side rear discharge shall be plumbed utilizing 2 1/2" schedule 10, stainless steel piping, 45 degree threaded elbows and a limited number of 90 degree sweep elbows in an assembly from the pump to the rear of the vehicle.

A minimum of one (1) Victaulic coupling shall be furnished in this assembly to allow for flex and serviceability.

A 2 1/2" Waterous full flow, ball valve shall be provided for the driver side rear discharge.

The driver side rear discharge valve shall be controlled by a rack and sector with push/pull handle located on the operator's panel.

A 2-1/2" NSTF X 1-1/2" NSTM reducer w/cap shall be provided on the drivers side rear discharge.

FIRE RESEARCH FLOWMETER

The driver side rear discharge shall be equipped with a Fire Research "Insight" Ultimate Flow/Pressure Meter, which shall give the operator or engineer an indication of actual volume of water (in gallons) being discharged through the specified line. The display shall also be capable of showing

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discharge pressure without the need of pushing any buttons.

A analog/digital display shall be mounted on the pump panel in place of a standard pressure gauge. The waterproof display case shall be constructed of aluminum, with bright red LCD digits to indicate flow, and a bright analog pointer to indicate pressure.

A flow sensor paddle wheel shall be installed on the discharge piping with a machined housing or clamp.

A pressure transmitter (transducer) shall be mounted in the discharge piping to indicate pressure only when the valve is open.

OFFICER SIDE REAR DISCHARGE

A 2 1/2" NST rear discharge shall be provided at the rear of the vehicle, plumbed from the pump.

The rear discharge shall terminate on the rear body panel, on the officer side of the body.

The officer side rear discharge pipe shall be equipped with a chrome 2 1/2" NSTM thread adapter.

The officer side rear discharge shall be plumbed utilizing 2 1/2" schedule 10, stainless steel piping, 45 degree threaded elbows and a limited number of 90 degree sweep elbows in an assembly from the pump to the rear of the vehicle.

A minimum of one (1) Victaulic coupling shall be furnished in this assembly to allow for flex and serviceability.

A 2 1/2" Waterous full flow, ball valve shall be provided for the officer side rear discharge.

The officer side rear discharge valve shall be controlled by a rack and sector with push/pull handle located on the operator's panel.

A 2-1/2" NSTF X 1-1/2" NSTM reducer w/cap shall be provided on the officers side rear discharge.

FIRE RESEARCH FLOWMETER

The officer side rear discharge shall be equipped with a Fire Research "Insight" Ultimate Flow/Pressure Meter, which shall give the operator or engineer an indication of actual volume of water (in gallons) being discharged through the specified line. The display shall also be capable of showing discharge pressure without the need of pushing any buttons.

A analog/digital display shall be mounted on the pump panel in place of a standard pressure gauge. The waterproof display case shall be constructed of aluminum, with bright red LCD digits to indicate flow, and a bright analog pointer to indicate pressure.

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A flow sensor paddle wheel shall be installed on the discharge piping with a machined housing or clamp.

A pressure transmitter (transducer) shall be mounted in the discharge piping to indicate pressure only when the valve is open.

HOSE BED DISCHARGES

Three (3) 2 1/2" NST rear hose bed discharges shall be plumbed to the upper front body panel, extending into the front of the hose bed.

The rear hose bed discharges shall terminate at the top of the body panel.

The hose bed discharge pipes shall be equipped with chrome 2 1/2" NSTM thread adapters.

The hose bed discharges shall be plumbed utilizing 2 1/2" schedule 10, stainless steel piping, 45 degree threaded elbows and a limited number of 90 degree sweep elbows in an assembly from the pump to the rear of the vehicle.

A minimum of one (1) Victaulic coupling shall be furnished in each assembly to allow for flex and serviceability.

2 1/2" Waterous full flow, ball valves shall be provided for the hose bed discharges.

The hose bed discharge valves shall be controlled by rack and sector with push/pull handles located on the operator's panel.

A 2-1/2" NSTF X 1-1/2" NSTM reducer w/cap shall be provided on each hose bed discharge.

FIRE RESEARCH FLOWMETERS

The hose bed discharges shall be equipped with Fire Research "Insight" Ultimate Flow/Pressure Meters, which shall give the operator or engineer an indication of actual volume of water (in gallons) being discharged through the specified line. The displays shall also be capable of showing discharge pressure without the need of pushing any buttons.

An analog/digital display shall be mounted on the pump panel in place of a standard pressure gauge. The waterproof display case shall be constructed of aluminum, with bright red LCD digits to indicate flow, and a bright analog pointer to indicate pressure.

A flow sensor paddle wheel shall be installed on the discharge piping with a machined housing or clamp.

A pressure transmitter (transducer) shall be mounted in the discharge piping to indicate pressure

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only when the valve is open.

DECK GUN DISCHARGE

A deck gun discharge shall be plumbed from the pump to an area on top of the vehicle. The deck gun piping shall be firmly supported and braced.

The deck gun discharge shall be located in the center of the dunnage area above the pump module, as directed by engineering based on components mounted in the dunnage area. A pedestal type, 1/4" steel plate support assembly shall be provided to stabilize deck gun plumbing below deck gun mount flange.

The deck gun discharge pipe shall terminate with 3" NPT threads.

The deck gun piping shall be designed so the overall height of the deck gun in the mounted/stowed position does not exceed the tallest point on the cab/body.

The deck gun discharge shall be plumbed utilizing 3" schedule 10, stainless steel piping, 45 degree threaded elbows and a limited number of 90 degree sweep elbows in an assembly from the pump to the deck gun location.

A minimum of one (1) Victaulic coupling shall be furnished in this assembly to allow for flex and serviceability.

A 3" Akron, #8800 series, full flow, stainless steel ball valve shall be provided for the deck gun discharge. The valve shall be equipped with the Akron "Tork-Lok" feature.

The deck gun discharge valve shall be equipped with an Akron Model # 9303 electric valve control on the operator's panel with function plate. The electric control shall be of current limiting design, requiring no clutches in the motor. The control shall be equipped with momentary open and close booted switches to operate actuator. The bezel and case shall be brass material. To indicate the position of the valve, the controllers must have individual red, yellow and green long life LED's with light pipes for maximum visibility.

The deck gun shall be a Stang Model CO302-11 deck gun equipped with a stream shaper and set of stacked tips as specified.

FIRE RESEARCH FLOWMETER

The deck gun discharge shall be equipped with a Fire Research Flow and Pressure Meter "Insight", which shall give the operator or engineer an indication of actual volume of water (in gallons) being discharged through the specified line. The display shall also be capable of showing discharge pressure without the need of pushing any buttons.

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A 4-1/2" analog/digital display mounted on the pump panel in place of a standard pressure gauge. The display case shall be constructed on non-glare black anodized aluminum, with bright red LCD digits to indicate flow, and a bright analog pointer to indicate pressure. A calibration slot shall be provided on the rear face of the display to make field calibration easy.

A flow sensor paddle wheel shall be installed on the discharge piping with a machined housing or clamp.

A pressure transmitter (transducer) mounted in the discharge piping. The pressure transducer shall be installed downstream from the discharge valve to indicate pressure only when the valve is open.

FRONT DISCHARGE

A 2 1/2" front #1 discharge shall be plumbed to the front bumper of the vehicle.

The front #1 discharge shall terminate on the top center of the front bumper extension gravel shield with a chrome 2 1/2" NSTM chicksan swivel adapter.

The front #1 discharge shall be plumbed utilizing 2 1/2" schedule 10, stainless steel piping, 45 degree threaded elbows and a limited number of 90 degree sweep elbows in an assembly from the pump to the front of the vehicle.

A minimum of one (1) Victaulic coupling shall be furnished in this assembly to allow for flex and serviceability. Automatic discharge drains shall be provided at all low points in the plumbing.

A 2 1/2" Waterous full flow, ball valve shall be provided for the front discharge.

The front #1 discharge valve shall be controlled by a rack and sector with push/pull handle located on the operator's panel.

A 2-1/2" NSTF X 1-1/2" NSTM reducer w/cap shall be provided on the front #1 discharge.

FIRE RESEARCH FLOWMETER

The front #1 discharge shall be equipped with a Fire Research "Insight" Ultimate Flow/Pressure Meter, which shall give the operator or engineer an indication of actual volume of water (in gallons) being discharged through the specified line. The display shall also be capable of showing discharge pressure without the need of pushing any buttons.

A analog/digital display shall be mounted on the pump panel in place of a standard pressure gauge. The waterproof display case shall be constructed of aluminum, with bright red LCD digits to indicate flow, and a bright analog pointer to indicate pressure.

A flow sensor paddle wheel shall be installed on the discharge piping with a machined housing

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or clamp.

A pressure transmitter (transducer) shall be mounted in the discharge piping to indicate pressure only when the valve is open.

HORIZONTAL CROSSLAY #1

A crosslay hose bed shall be provided and plumbed from the pump in a transverse design, located above the pump enclosure for quick attack deployment. The crosslay hose bed flooring shall be designed to be removable, constructed from brushed finish, perforated aluminum material.

Crosslay #1 shall be designed to have a minimum total capacity of 3.5 cubic feet as required by NFPA -1901 to accommodate a minimum of 200 feet of 1-3/4" fire hose.

Crosslay #1 hose bed shall be designed to accommodate the fire hose in a single stack configuration.

The crosslay discharge shall terminate below the hose bed floor with a 1 1/2" NSTM chicksan swivel adapter. The crosslay hose bed floor shall be slotted to allow the swivel to extend up through the floor, allowing the pre-connected hose to be pulled off either side of the apparatus without kinking the hose at the coupling connection.

The crosslay #1 discharge shall be plumbed utilizing 2" schedule 10, stainless steel piping and/or flexible hose, 45 degree threaded elbows and a limited number of 90 degree sweep elbows in an assembly from the pump to crosslay hose bed.

A minimum of one (1) Victaulic coupling shall be furnished in this assembly to allow for flex and serviceability.

A 2 1/2" Waterous full flow, ball valve shall be provided for the crosslay #1 discharge.

The crosslay #1 discharge valve shall be controlled by a rack and sector with push/pull handle located on the operator's panel.

FIRE RESEARCH FLOWMETER

The crosslay #1 discharge shall be equipped with a Fire Research "Insight" Ultimate Flow/Pressure Meter, which shall give the operator or engineer an indication of actual volume of water (in gallons) being discharged through the specified line. The display shall also be capable of showing discharge pressure without the need of pushing any buttons.

A analog/digital display shall be mounted on the pump panel in place of a standard pressure gauge. The waterproof display case shall be constructed of aluminum, with bright red LCD digits to indicate flow, and a bright analog pointer to indicate pressure.

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A flow sensor paddle wheel shall be installed on the discharge piping with a machined housing or clamp.

A pressure transmitter (transducer) shall be mounted in the discharge piping to indicate pressure only when the valve is open.

HORIZONTAL CROSSLAY #2

A crosslay hose bed shall be provided and plumbed from the pump in a transverse design, located above the pump enclosure for quick attack deployment. The crosslay hose bed flooring shall be designed to be removable, constructed from brushed finish, perforated aluminum material.

Crosslay #2 shall be designed to have a minimum total capacity of 3.5 cubic feet as required by NFPA -1901 to accommodate a minimum of 200 feet of 1-3/4" fire hose.

Crosslay #2 hose bed shall be designed to accommodate the fire hose in a single stack configuration.

The crosslay discharge shall terminate below the hose bed floor with a 1 1/2" NSTM chicksan swivel adapter. The crosslay hose bed floor shall be slotted to allow the swivel to extend up through the floor, allowing the pre-connected hose to be pulled off either side of the apparatus without kinking the hose at the coupling connection.

The crosslay #2 discharge shall be plumbed utilizing 2" schedule 10, stainless steel piping and/or flexible hose, 45 degree threaded elbows and a limited number of 90 degree sweep elbows in an assembly from the pump to crosslay hose bed.

A minimum of one (1) Victaulic coupling shall be furnished in this assembly to allow for flex and serviceability.

A 2 1/2" Waterous full flow, ball valve shall be provided for the crosslay #2 discharge.

The crosslay #2 discharge valve shall be controlled by a rack and sector with push/pull handle located on the operator's panel.

FIRE RESEARCH FLOWMETER

The crosslay #2 discharge shall be equipped with a Fire Research "Insight" Ultimate Flow/Pressure Meter, which shall give the operator or engineer an indication of actual volume of water (in gallons) being discharged through the specified line. The display shall also be capable of showing discharge pressure without the need of pushing any buttons.

An analog/digital display shall be mounted on the pump panel in place of a standard pressure gauge. The waterproof display case shall be constructed of aluminum, with bright red LCD digits to

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indicate flow, and a bright analog pointer to indicate pressure.

A flow sensor paddle wheel shall be installed on the discharge piping with a machined housing or clamp.

A pressure transmitter (transducer) shall be mounted in the discharge piping to indicate pressure only when the valve is open.

HORIZONTAL CROSSLAY #3

A crosslay hose bed shall be provided and plumbed from the pump in a transverse design, located above the pump enclosure for quick attack deployment. The crosslay hose bed flooring shall be designed to be removable, constructed from brushed finish, perforated aluminum material.

Crosslay #3 shall be designed to have a minimum total capacity of 3.5 cubic feet as required by NFPA -1901 to accommodate a minimum of 200 feet of 2 1/2" fire hose.

Crosslay #3 hose bed shall be designed to accommodate the fire hose in a single stack configuration.

The crosslay discharge shall terminate below the hose bed floor with a 2 1/2" NSTM chicksan swivel adapter. The crosslay hose bed floor shall be slotted to allow the swivel to extend up through the floor, allowing the pre-connected hose to be pulled off either side of the apparatus without kinking the hose at the coupling connection.

The crosslay #3 discharge shall be plumbed utilizing 2 1/2" schedule 10, stainless steel piping and/or flexible hose, 45 degree threaded elbows and a limited number of 90 degree sweep elbows in an assembly from the pump to crosslay hose bed.

A minimum of one (1) Victaulic coupling shall be furnished in this assembly to allow for flex and serviceability.

A 2 1/2" Waterous full flow, ball valve shall be provided for the crosslay #3 discharge.

The crosslay #3 discharge valve shall be controlled by a rack and sector with push/pull handle located on the operator's panel.

FIRE RESEARCH FLOWMETER

The crosslay #3 discharge shall be equipped with a Fire Research "Insight" Ultimate Flow/Pressure Meter, which shall give the operator or engineer an indication of actual volume of water (in gallons) being discharged through the specified line. The display shall also be capable of showing discharge pressure without the need of pushing any buttons.

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A analog/digital display shall be mounted on the pump panel in place of a standard pressure gauge. The waterproof display case shall be constructed of aluminum, with bright red LCD digits to indicate flow, and a bright analog pointer to indicate pressure.

A flow sensor paddle wheel shall be installed on the discharge piping with a machined housing or clamp.

A pressure transmitter (transducer) shall be mounted in the discharge piping to indicate pressure only when the valve is open.

The crosslay hose bed floor will be approximately 42" above the side running board and no more than 66" above ground level.

PUMP ENCLOSURE HOSEBED HOSE RETENTION

A vinyl cross lay cover shall be provided. It shall be securely fastened at the front with snaps and Velcro at the rear, with straps to secure each end flap.

The crosslay cover shall be red in color.

BOOSTER REEL DISCHARGE

A 1-1/2" booster reel discharge shall be plumbed from the pump to the booster reel.

The booster reel discharge shall be plumbed from the valve to the hose reel utilizing 1" high pressure hose. The end of the hose connected to the hose reel shall be equipped with a swivel end for ease in hose replacement.

A 1-1/2" Akron, #8800 series, full flow, stainless steel ball valve shall be provided for the booster reel #1 discharge. The valve shall be equipped with the Akron "Tork-Lok" feature.

The booster reel discharge valve shall be controlled by a push/pull handle located on the operator's panel.

The booster reel discharge shall be equipped with a No-Shok 3" diameter silicone filled pressure gauge with pulse and vibration dampening. The gauge accuracy shall comply with ANSI B40.1 Grade A requirements, temperature range shall be from -40° F to +160° F.

Gauges construction shall be a heavy duty cast brass case. Crystal shall be a molded plexiglass with captive O-ring and secured with a rolled 304 highly polished stainless steel bezel. Gauges shall have white faces with black lettering and shall include an orange tip pointer for easy readability.

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BOOSTER REEL

One (1) painted steel electric rewind booster reel shall be furnished. The reel shall be equipped with a water lubricated; self flushing, bronze swivel joint and an adjustable brake for free wheeling, drag or full lock operation.

The booster reel shall be mounted above the pump enclosure towards the driver's side of the unit.

Booster reel rewind shall be controlled by a pump panel mounted push button on each side panel. The booster reel circuit shall be equipped with a shielded toggle switch to act as a booster reel disconnect to avoid accidental actuation of the booster reel rewind buttons.

The booster reel shall be equipped with 150' of 1" **Reelite cloth/rigid hose** booster hose in (1) 100' section and (1) 50' section. Each length shall be fitted with NST couplings.

Two (2) horizontal hose rollers of polished stainless steel and guide spools shall be placed one (1) on each side panel.

FOAM PIPING

All foam concentrate plumbing from the tank or auxiliary foam inlet to the foam system components shall be stainless steel.

The foam system piping shall incorporate a check valve to prevent water from entering the foam tank; the discharge piping also include a check valve to prevent foam solution from back feeding into the discharge side of the pump. Individual discharge piping shall be as specified for each discharge.

The complete foam system shall be tested in accordance with Chapter 17 of NFPA-1901.

FOAM SYSTEM (SINGLE DISCHARGE)

An Akron #3126, in-line, bypass foam system shall be provided, which incorporates an operator's panel controlled in-line foam eductor plumbed into the specified 1 1/2" discharge to flow foam at a maximum rate of 125 gallons per minute. The eductor shall be capable of bypassing the foam venturi to allow higher GPM flows through the discharge. This system shall include an operator's panel mounted metering valve and individual controls for the foam eductor and foam flush.

The in-line foam system shall be installed in the crosslay #1 discharge plumbing.

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PUMP PANEL - SIDE MOUNT

The pump operator's control panel shall be located on the driver side of the apparatus. The pump enclosure side panels shall be completely removable and designed for easy access and servicing.

PUMP PANEL MATERIAL

The left side operator's panel, gauge panel, right side pump panel and right side access door shall be fabricated from 1/8" aluminum, coated with black Speed-I-liner material. The Speed-I-liner material shall provide a non-glare, rubberized textured finish.

HINGED GAUGE PANEL

A full width, vertically hinged gauge access panel shall be provided at the operator's position. Chrome plated positive locks shall be provided along with chain holders to prevent the front of the gauge panel from coming in contact with other panels when open.

HINGED PUMP ACCESS DOOR

A 18" high by a minimum of 30" wide pump enclosure access door shall be provided above the officer's side pump panel. This door shall have a "D" ring, two-point latch mechanism and two (2) gas shock stay arms for ease of access.

PUMP ACCESS PANELS

Two (2) removable pump access panels shall be furnished at the forward area of the pump enclosure accessed from the front when the cab is tilted. Each access panel shall be fabricated from 1/8" aluminum tread plate.

PANEL FASTENERS

Stainless steel machine screws and lock washers shall be used to hold these panels in position. The panels shall be easily removable to provide complete access to the pump for major service.

CAPS AND ADAPTERS SAFETY TETHER

All applicable discharge and suction caps, plugs and adapters shall be equipped with chrome plated ball chain or double looped coil chain and secured to the vehicle.

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PUMP OPERATOR'S PANEL LIGHTING

The operator's panel shall be illuminated by using a minimum of four (4) Weldon #2630 clear lens lights under a polished stainless steel light shield. The shield shall be full width of control panel, and shall be positioned to cover the lights and prevent glare.

One (1) light under the operator's panel light shield shall be actuated when fire pump is engaged in addition to the pump engaged light.

OFFICER SIDE PUMP PANEL LIGHTING

The officer's side pump panel and running board shall be illuminated by two (2) Weldon #9186 shielded step lights mounted on the side panel and activated with the pump panel lights.

PUMP PANEL TRIM PLATES

A high polish stainless steel trim plate shall be provided around each discharge port and suction inlet opening to allow accessibility to the respective valve for service and repairs.

COLOR CODED IDENTIFICATION TAGS

Color coded identification tags shall be provided for all gauges, controls, connections, switches, inlets and outlets.

PUMP OPERATOR'S PANEL

Particular attention is to be given to functional arrangement of all controls. The pump operator's panel shall accommodate the following:

- Hinged gauge panel
- Water tank fill valve
- Auxiliary suction valve control
- All discharge valve controls
- Auxiliary engine cooler controls
- Water tank suction control valve
- Pump primer valve
- Engine throttle control
- Master compound vacuum gauge
- Master pressure gauge
- Individual discharge gauges
- Pump shift engaged indicator light

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- Water tank water level indicator
- Engine tachometer
- Engine oil pressure gauge with audible alarm
- Engine water temperature gauge with audible alarm
- Low voltage light and audible alarm
- Pump panel light switch
- Speed counter (Underwriters)
- Pump performance plate (Underwriters)
- Pump serial No. plate
- Master pump drain valve
- Individual drains
- Voltmeter
- Air inlet/outlet at lower left hand panel
- Fuel Gauge
- Pump panel air horn actuation button
- Engine high idle switch (1200 R.P.M.)
- Waterous manual transfer valve control (two-stage pump)
- 1/2" Pump cooler (Bypass Line)
- Fire Research #TGA400 "IN CONTROL" pressure governor control

PUMP TEST PORTS

The pump panel shall be equipped with Vacuum & Pressure test plugs to allow for test equipment to monitor pump pressure and vacuum levels. Chrome plugs and labels shall be provided for the test ports.

MASTER GAUGES

One (1) 6" diameter pressure gauge (labeled: "PRESSURE") and one (1) 6" diameter compound vacuum gauge (labeled: "INTAKE") shall be provided. The master gauges shall be Class One Sub-Z II, silicone filled. The gauge faces shall be white with black numerals.

PRESSURE & COMPOUND GAUGE RANGES

All applicable pressure gauges shall have a range of 0 - 600 P.S.I., and the compound gauge shall have a range of -30" - 0 - 600 P.S.I.

ENGINE COOLER

An auxiliary cooler or heat exchanger shall be installed in the engine compartment between the engine and the chassis radiator. The cooler shall permit the use of water from the pump for cooling

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system. The cooling shall be done without mixing engine and pump water.

TANK LEVEL GAUGE

A Fire Research, Model #WLA200-A00, "TANKVISION" gauge that shows the actual volume of water in the tank shall be provided on the pump operator's panel. The "TANKVISION" gauge is designed for both ease of operation and installation. The "TANKVISION" gauge utilizes ultra bright LEDs for sunlight readability and also uses 2 sophisticatedly designed wide-viewing lens for 180° of clear viewing. The "TANKVISION" gauge utilizes a pressure sender to measure the liquid volume. The gauge shall be equipped self-calibration feature allows the LED's TANKVISION gauge to be used on tanks of different shapes and sizes.

Features:

- Flashes warning when the volume is less than 25%. Rapid down scrolling LED's alert the operator when the tank is almost empty. Remote audio warning available
- One size fits all'. The self-calibration feature allows for easy calibration of any shape or size tank
- Multiple displays are possible with a single sender through the FRC data bus
- Rugged waterproof cast aluminum housing
- No fitting needed for poly tank.
- Special fittings available for other tank materials.
- Connector disconnects at back of display

The gauge shall use a pressure transducer installed near the bottom of the water tank to determine the correct volume in the tank.

FOAM TANK LEVEL GAUGE - FOAM TANK

A Fire Research, Model #WLA260-A00, "TANKVISION" gauge that shows the actual volume of foam in the tank shall be provided on the pump operator's panel. The "TANKVISION" gauge is designed for both ease of operation and installation. The "TANKVISION" gauge utilizes ultra bright LED's for sunlight readability and also uses 2 sophisticatedly designed wide-viewing lens for 180° of clear viewing. The "TANKVISION" gauge utilizes a pressure sender to measure the liquid volume. The gauge shall be equipped self-calibration feature allows the TANKVISION gauge to be used on tanks of different shapes and sizes.

The gauge shall use a pressure transducer installed near the bottom of the foam tank to determine the correct volume in the tank.

CAST PRODUCTS MICROPHONE BOX

A Cast Products #EB0001-1-A, 7" wide x 13.75" high x 6.75" deep microphone box shall be provided.

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The microphone box shall be recessed in an applicable location determined at the Pre-construction meeting.

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WATER TANK

The water tank shall have a capacity of 500 gallons, constructed from Poly material.

The Poly water tank shall be constructed from 1/2" thick polypropylene sheet stock. This material shall be a non corrosive stress relieved thermo-plastic, natural in color, and U.V. stabilized for maximum protection.

FOAM TANK

In addition to the water capacity of the tank, an 80 - 100 gallon integral foam storage area shall be built into the water tank. The foam tank shall have a latched fill tower, properly labeled as the foam fill point. A valved drain shall be provided.

The water and foam tanks shall be of a specific configuration and is also designed to be completely independent of the body and compartments. All joints and seams shall be nitrogen welded and tested for maximum strength and integrity. The top of the booster tank is fitted with removable lifting eyes designed with a 3 to 1 safety factor to facilitate easy removability. The transverse swash partitions shall be manufactured of 3/8" polypropylene (natural in color) and extend from approximately 4" off the floor to just under the cover. The longitudinal swash partitions shall be constructed of 3/8" polypropylene (natural in color) and extend from 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 hoses to permit movement of air and water between compartments. The partitions shall be designed to provide maximum water flow. All swash partitions interlock with one another and are welded to each other as well as to the walls of the tank.

TANK LID

The tank cover shall be constructed of 1/2" thick polypropylene, natural in color, and U.V. stabilized, to incorporate a multi three-piece design, which allows for individual removal and inspection if necessary. The tank cover shall be recessed 3/8" from the top of the tank and shall be welded to both sides and longitudinal partitions for maximum integrity. Each one of the covers shall have hold downs consisting of 2" polypropylene dowels spaced a maximum of 30" apart. These dowels shall extend through the covers and become welded to the transverse partitions. This shall assist in keeping the cover 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.

TANK FILL TOWER

The tank shall have a combination vent and manual fill tower. The fill tower shall be constructed of 1/2" polypropylene and shall be a minimum dimension of 12" x 12" outer perimeter. The tower shall be located in the left front corner of the tank unless otherwise specified by the purchaser in Special Provisions. The tower shall have a 1/4" thick removable polypropylene screen and a polypropylene hinged type cover. The fill tower cover shall be marked as a water tank fill point.

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OVERFLOW AND VENT PIPE

The fill tower shall be fitted with an integral 4" I.D. schedule 40 P.V.C. combination overflow/vent pipe running from the fill tower through the tank to a 4" coupling flush mounted into the bottom of the tank to allow water to overflow behind the chassis rear axle.

TANK SUMP

The tank sump shall be a minimum of 10" wide x 10" long x 3" deep. An anti-swirl plate shall be mounted inside the sump, approximately 1" above the bottom of the sump.

TANK SUMP CONNECTION

The front bulkhead of the water tank shall be fitted with one (1).

A 3" drain plug shall be provided.

OUTLETS

There shall be two (2) standard tank outlets; one for tank-to-pump suction line which shall be a minimum of 4" coupling and one for a tank fill line which shall be a minimum of a 2" N.P.T. coupling. All tank fill couplings shall be backed with flow deflectors to break up the stream of water entering the tank.

TANK MOUNTING

The tank shall rest on the body cross members spaced a maximum of 22" apart, and shall be insulated from these cross members with a minimum of 3/8" nylon webbing or 1/2" rubber, 2-1/2" wide. The tank shall sit cradle-mounted using four (4) corner angles of 6 x 6 x 4 x 0.250 welded directly to the body cross members. The angles shall keep the tank from shifting left to right or front to rear. The tank is designed on the free-floating suspension principle and shall not require the use of hold downs. The tank shall be completely removable without disturbing or dismantling the apparatus body structure. The body or hose bed cross braces shall act as water tank retainers.

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APPARATUS BODY DESIGN CONSTRUCTION

The body side and compartment assemblies shall be designed and assembled to provide maximum strength and durability under all operating conditions.

Special attention shall be taken to minimize corrosion on all fabricated parts and structural members of the body. All bolt on components shall be provided with a dissimilar metals isolation barrier to prevent electric corrosion. The body design shall also incorporate removable panels to access spring hangers, rear body mounts and fuel tank sending units.

The body assembly shall be an all-welded configuration. The body shall be completely isolated from the cab and pump module structure.

BODY AND COMPARTMENT FABRICATION - 3/16" ALUMINUM

All compartment panels and body side sheets shall be entirely 3/16" aluminum (5052-H32). Each side compartment assembly shall be both plug welded and stitch welded to ensure proper weld penetration on all panels while avoiding the possible warping caused by a full seam weld. The side compartments shall be welded on a fixture to ensure true body dimensions and squareness of all door openings. The side compartments and body side panels are then set into a body squaring fixture where the super structure is installed and the entire body is aligned to be completely symmetrical. The super structure is then welded to the compartment side panels and reinforcement plates are inserted which allows the compartment panels to become an integral component of the body support structure. A full seam weld shall not be used due to the applied heat which shall distort sheet metal and remove the protective coating from the perimeter of the welded area. All seams shall be caulked prior to finish paint to ensure proper compartment seal.

100" WIDE FIRE BODY

The fire body shall be 100" wide to provide the maximum amount of usable compartment space. All lower compartments shall be 27" deep overall, all upper compartments will be 14" deep overall.

SUPER STRUCTURE - ALUMINUM

The body super structure shall be an all welded configuration utilizing a combination of 3" x 1-1/2" 6061-T6 thick walled structural tubing and 6061 structural channel.

This structure shall be designed to totally support the full length and width of the body and shall be welded to the body side compartments by use of reinforcement plates to incorporate the compartments into an integral part of the body weldment.

The super structure shall be bolted to the sides of the chassis frame at four (4) points.

STEPPING, STANDING, & WALKING SURFACES

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All stepping, standing, and walking surfaces on the body shall meet NFPA #1901 anti-slip standards. Aluminum tread plate utilized for stepping, standing, and walking surfaces shall be Alcoa No Slip type. This material shall be certified to meet the NFPA #1901 standard. Upon request by the Purchaser, manufacturer shall supply proof of compliance with this requirement. (There shall be No Exceptions allowed for this paragraph)

DRIVER'S SIDE COMPARTMENTATION

One (1) full height compartment shall be provided forward of the rear wheels, measuring 66" high x 31" wide with a single roll-up door opening 62" high x 28" wide.

One (1) full height compartment shall be provided to the rear of the rear wheels, measuring 66" high x 49" wide with a single roll-up door opening 62" high x 46" wide.

One (1) equipment compartment shall be provided above the rear wheels, measuring 34" high x 59" wide with a single roll-up door opening 30" high x 53" wide.

The driver's side body compartments shall be 27" deep in the lower full depth section and 14" deep in the upper section.

OFFICER'S SIDE COMPARTMENTATION

One (1) low side compartment shall be provided forward of the rear wheels, measuring 34" high x 31" wide with a single roll-up door opening 30" high x 28" wide.

One (1) low side compartment shall be provided to the rear of the rear wheels, measuring 34" high x 49" wide with a single roll-up door opening 30" high x 46" wide.

The officer's side body compartments shall be 27" deep in the lower full depth section and 14" deep in the upper section.

ROLL-UP DOORS

Roll-up doors shall be provided on all compartments. The roll-up doors shall be constructed from aluminum extruded slats which shall have a flexible seal between each slat for proper sealing of the door.

A synthetic rubber seal shall be provided at each side, top and bottom edge of the door to prevent entry of dirt into the compartment.

The door shall be equipped with a lift bar style latch mechanism which shall latch at the bottom of the door mounting extrusion.

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The roll-up door assembly shall be furnished with a spring-loaded, counter balance assembly to assist in door actuation.

All running board and high side air pack compartments shall be equipped with roll-up doors.

ROBINSON ROLL-UP DOORS

The roll-up doors shall be Robinson (ROM) brand roll-up doors. The doors and tracks shall be painted to match the required color of the Fire Department.

A total of five (5) painted doors shall be provided.

BEAVERTAILS

The rear body beavertail area shall be furnished with a squared off appearance to maximize the available compartment area, while providing added support to the rear step support structure. The beavertail panels shall be assembled in conjunction with the rear body corner panels, utilizing a 2" radius for the full height of the body side compartments. This assembly shall provide a vertical mounting surface for tail lights at the rear most portion of the body and additional storage space.

The inside of the beavertails shall be furnished with polished aluminum tread plate overlays.

COMPARTMENT TOPS

Compartments shall have full welded in ceilings as an integral part of the body construction.

Compartment tops shall be covered with polished aluminum tread plate on both sides. The compartment tops shall be flanged up at hose bed wall, and shall have a 90 degree flange downward over the top of compartments with a 2" radius corner to provide a snag-free body design.

DRIP MOLDING

Compartment tops over all side compartments shall have a 45 degree flange formed out to provide protection against water run off. A secondary extruded drip molding shall be provided between low compartments and auxiliary high side compartments, when auxiliary compartments are provided.

FASTENERS

All exterior fasteners used for holding panels or tread plate shall be stainless steel. In no case shall pop rivets or self-tapping screws be used.

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COMPARTMENT LOUVERS

Machine stamped ventilating louvers shall be furnished in each compartment, and so located that water cannot normally enter the compartment.

A perforated, polished, stainless steel grille shall be furnished between compartments for ventilation in the event that the compartment configuration does not allow louvers to ventilate to the atmosphere.

ACCESS PANELS

Removable access panels shall be provided in all lower compartments to access spring pins, fuel tank sender, electrical junction compartment and rear body mounts.

Protective panels shall be located in the rear compartments providing access to the lights and associated wiring. The covers shall also serve as protective covers to prevent inadvertent damage to lights or wiring from tools or equipment located in the compartment.

BODY PROTECTION PANELS

The front face of the side compartments, next to the left and right pump panels shall be overlaid with 1/8" aluminum tread plate full height protection. This trim shall be rolled around the vertical outside radius to the forward compartment door openings on each side of the body.

REAR BODY PANEL

The rear body panel shall be fabricated from a minimum of 3/16" polished aluminum tread plate and shall extend the full width between the beavertails. This panel shall be full height from the rear step to the hose bed floor. The panel shall be bolted on and removable, with no part of the rear panel attached to the booster tank.

REAR STANCHIONS - CAST ALUMINUM

Two (2) Cast Products Model #LB0029-1, polished stanchion brackets with wiring protectors, shall be provided at the rear of the body for upper rear warning light mounting, one (1) each side. These brackets shall be bolted to the sides of the body to minimize rear vehicle height.

BODY RUB RAILS

Sacrificial aluminum tread plate rub rails shall be mounted at the base of the body, extend outward a minimum 3/4", downward 2" and flange inward 1". The rub rails shall extend the full length of the main

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body and wrap around the rear body corners. Rub rails shall be designed to bolt to the body from the bottom side of the compartment area, so as not to damage the body side panels on initial impact and to provide for ease of replacement.

RUNNING BOARD STEPS

The driver and officer running board steps shall be fabricated of 3/16" polished aluminum tread plate. The outside edge on each step shall be fabricated with a double break, return flange. The steps shall be rigidly reinforced with a heavy duty support structure. The running boards shall not form any part of the compartment design, and shall be bolted into place with a minimum 1/2" clearance gap between any panel to facilitate water runoff.

OFFICER SIDE RUNNING BOARD STORAGE WELL

A **drop in style** storage well, constructed of 1/8" aluminum, shall be recessed into the officer's side running board. The storage well shall measure 9" deep x 9" wide x as long as possible between the running board support members. Drain holes shall be located in the bottom corners to allow water to drain from the storage well.

The officer's side running board hose well shall be furnished with velcro straps to secure the hose stored in the well. The straps shall be attached to each side of the hose well with stainless steel footman loops.

DRIVER SIDE RUNNING BOARD STORAGE WELL

A **drop in style** storage well, constructed of 1/8" aluminum, shall be recessed into the driver's side running board. The storage well shall measure 9" deep x 9" wide x as long as possible between the running board support members. Drain holes shall be located in the bottom corners to allow water to drain from the storage well.

The driver's side running board hose well shall be furnished with velcro straps to secure the hose stored in the well. The straps shall be attached to each side of the hose well with stainless steel footman loops.

REAR STEP

The rear step shall be twelve (12) inches deep, recessed between the rear portion of the rear side compartments. The step shall be fabricated from 3/16" polished aluminum tread plate, and shall be rigidly reinforced. The recessed design of the rear step shall reduce the rear side compartment depth at the rear 9 inch wide area to 12" deep with a 72" wide rear step.

The rear edge of the step shall be designed to accommodate the rear clearance lights, recessed

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for protection in the step reinforcement channel. This step shall be bolted into place with a minimum 1/2" clearance gap between it and the body panel.

INTERMEDIATE REAR STEP

An eight (8) inch deep, bolt on intermediate rear step, fabricated from 3/16" aluminum tread plate, shall be installed. The step shall be approximately 8" deep x 48" wide.

ISOLATED REAR STEP COMPARTMENT

An isolated rear step compartment measuring 30" high x 46" wide x 24" deep with a door opening of 31" high x 43-3/4" wide shall be provided at the rear of the apparatus.

The rear step compartment door shall be a roll-up door. The roll-up door shall be equipped with a brushed aluminum finish.

GRAB RAILS

All hand rails shall be 1-1/4" outer diameter, knurled bright anodized aluminum extrusion, designed to meet NFPA 1901 requirements.

Molded gaskets shall be installed between the handrail stanchion castings and body surfaces to prevent electrolytic reaction between dissimilar metals and to protect paint.

GRAB RAIL LOCATIONS:

- One (1) horizontal, full width handrail shall be installed on the rear, below the level of the hose bed.
- A full width rail shall be mounted between the rear warning light support brackets.
- Two (2) horizontal handrails shall be mounted above each pump panel, (1) each side, to assist access from the running board steps to the top of the body.

FOLDING STEPS

Three (3) Austin Hardware Model FS-200 CHR large folding steps, made of high strength die cast aluminum, with a textured chrome plate finish, minimum of 42 in² surface, conforming to NFPA-1901 requirements, shall be provided on the front face of the running board compartments, above running board steps, two (2) on the **driver's** side and **one (1) on the officer's** side. The steps shall be mounted to accommodate access to the body hose bed area with a maximum of 18" height between each step.

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FOLDING STEPS

Four (4) Austin Hardware Model FS-200 CHR large folding steps, made of high strength die cast aluminum, with a textured chrome plate finish, minimum of 42 in² surface, conforming to NFPA-1901 requirements, shall be provided on the rear of the body, two (2) each side. The steps shall be mounted to accommodate access to the body hose bed area with a maximum of 18" height between each step.

SAFETY SIGN(S) AT REAR STEP AND CROSS WALKWAY(S)

Safety sign(s) shall be located on the vehicle at the rear step, and at any cross walkway(s), to warn personnel that riding in or on these areas while the vehicle is in motion is prohibited.

REAR WHEEL WELL LINERS

Fully removable, bolt-in, 12 gauge stainless steel fender liners shall be provided. The wheel well liners shall extend from the outer wheel well body panel, into the truck frame. Removable vertical splash shields, inward of the wheels, shall be provided to give access to the hydraulic components. The completely washable fender liners shall be designed to protect the front and rear compartments and main body supports from road salts, dirt accumulation and corrosion. Fender liners which are welded in place or are only partially removable shall not be considered.

REAR FENDERETTES

The single rear fenders shall be trimmed with replaceable, bolt-in, molded black rubber fenderettes. The fenderettes shall be secured to the body with stainless steel threaded fasteners along the internal perimeter of the wheel well. Rubber welting shall be installed between the fenderettes and the body fender.

AIR BOTTLE STORAGE COMPARTMENTS

A total of seven (7) SCBA air bottle storage compartments (8" high x 8" wide x 26" deep) shall be inserted into the body fender area on a 5 degree pitch. The compartments shall be located with three (3) on the driver side and four (4) on the officer side of the rear body fender panels. The lower portion of the compartments shall be rubber lined to absorb shock and help secure the bottle.

Each storage compartment shall be equipped with a polished stainless steel door.

MUD FLAPS

Heavy duty mud flaps shall be provided behind the rear wheels.

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REAR TOW EYES

Two (2) painted tow eyes shall be furnished on the rear of the vehicle. The tow eyes shall be made from plate steel and shall be bolted directly to the chassis frame rails with grade 8 bolts and shall extend below the body. The tow eyes shall be smooth and free from sharp edges, and have a minimum eyelet hole of 2-1/2". The tow eyes shall be painted.

Two (2) painted tow eyes shall be furnished within the rear step compartment, accessed through the rear step compartment door. The tow eyes shall be made from plate steel and shall be bolted directly to the chassis frame rails with grade 8 bolts. The tow eyes shall be smooth and free from sharp edges, and have a minimum eyelet hole of 2-1/2". The tow eyes shall be painted.

HOSE BED (72" WIDE)

The hose bed shall be located directly above the booster tank and shall be free from all sharp objects such as bolts, nuts, etc., to avoid damage to fire hose.

For added strength, rigidity and appearance, the hose bed side walls shall have the top edge flanged outward two (2) inches and downward one (1) inch. In a similar fashion, the top edge of the front wall shall be flanged inward two (2) inches and downward one (1) inch.

The hose bed shall provide a approximately 80 cubic feet hose storage area for 1-3/4" or larger fire hose to meet NFPA 1901 minimum pumper hose storage requirements.

The hose bed shall be a lowered design with the bottom of the hose bed no higher than 58" from the ground.

HOSE BED FLOORING

Flooring to be constructed from Ryerson Dura-Deck, fiberglass I-Beam flooring material. The flooring shall be smooth and free from sharp edges to avoid hose damage. The hose bed floor shall be removable to provide access to inner body framework.

HOSE BED LINING - W/TOP CAP

The inside front and both side walls of hose bed shall lined with plain brushed finish (unpainted) aluminum. The top edge and outside top body flange shall be covered with aluminum diamond plate, front and both sides.

HOSE BED PARTITIONS

Four (4) fully adjustable, 3/16" brush finish, aluminum hose bed partitions shall be provided.

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Partitions shall be removable for access to the booster tank.

The top and rear edge of each of the adjustable hose bed partitions shall have an integral tubing reinforcement welded on for additional support.

VINYL HOSE BED COVER - 1/4 TURN FASTENERS

A hose bed cover shall be provided and installed. The cover shall be made from 22 ounce; heavy-duty vinyl coated polyester fabric (TXN 226). The cover shall be sewn with ultraviolet resistant thread and shall have 2" wide nylon webbing sewn around the perimeter to provide additional strength.

The cover shall be secured to the top front body flange with quarter-turn fasteners and Velcro. The cover shall be secured to the side body flanges with quarter-turn fasteners. A weighted flap shall be furnished on the rear of the cover with two (2) bungee cords.

The Hypalon material shall be red in color.

ADJUSTABLE SHELVING

Compartment shelving shall be constructed of 3/16" brush finish aluminum with a 2" upward bend at front and rear, and side supports. Shelving shall be vertically adjustable with spring nuts in aluminum strut channel.

Adjustable shelves shall be located as follows:

- Four (4) adjustable shelves shall be provided and mounted as directed by the Fire Department.

SLIDE OUT FLOOR MOUNT SHELVING

Slide out floor mount compartment shelving shall be constructed of 3/16 brush finish aluminum with a 2" upward bend at front and rear, and side supports attached to #250 rated slides. Slide out floor mount shelving shall have gas shocks to hold the tray in and out.

Slide out floor mount shelving shall be provided as follows:

- Two (2) roll out tray(s) shall be provided and mounted as directed by the Fire Department.

DRI-DECKING

Dri-Deck brand floor material shall be installed on all compartment floors. The Dri-Deck shall be custom installed to provide a full floor coverage.

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- Floor matting material shall be provided on six (6) specified shelves or roll-out trays.
- The compartment flooring color shall be black with a beveled edge.

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120/240 VOLT ELECTRICAL SYSTEM TESTING

All line voltage wiring and permanently connected devices and equipment shall be subjected to a dielectric voltage withstand test of 900 volts for one minute. The test shall be conducted between live parts and the neutral conductor and between live parts and the vehicle frame with any switches in the circuits closed. The test shall be conducted after all bodywork has been completed. The dielectric tester shall have a minimum 500 VA transformer with a sinusoidal output voltage that can be verified.

Electrical polarity verification shall be made of all permanently wired equipment and receptacles to determine that connections have been properly made.

OPERATIONAL TESTING

The apparatus manufacturer shall perform the following operation test and shall certify that the power source and any devices that are attached to the line voltage electrical system are properly connected and in working order.

The generator shall be started from a cold start condition and the line voltage electrical system loaded to 100 percent of the nameplate voltage rating.

The following items shall be monitored and documented every 15 minutes:

- The cranking time until the generator starts and runs.
- The voltage, frequency, and amperes at continuous full rated load.
- The generator oil pressure, water temperature, transmission temperature, hydraulic temperature, and the battery rate charge, as applicable.
- The ambient temperature and altitude.

The generator shall operate at 100 percent of its nameplate wattage for a minimum of two (2) hours.

HARRISON 15,000-WATT HYDRAULIC DRIVEN GENERATOR

One (1) Harrison Hydraulic Driven Generator Model number 15.0MPC-16D rated at 15000 watts, 63/125 amps, 120/240VAC, 60 Hz, 1-phase shall be provided.

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 at the full nameplate load prior to shipping and be accompanied with the test report. The test report shall document the generators performance at various loads from no load to full load to ensure reliable power delivery at those 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, manifold containing a cross port check valve and relief valve.

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The generator shall be a continuous duty, industrial type with a heavy-duty bearing and of brush less 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, low fluid level sensor, high temperature sensor 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 single bearing alternator design. No two (2) bearing generators shall be permitted.

The system must be capable of producing the full nameplate power when driven from the vehicle PTO from idle to maximum engine speed. The generator system must be able to operate on either a Constant Engaged PTO or a Hot Shift PTO. Determination as to which PTO to use shall be made by the Fire Department. The generator must be able to be used while vehicle is either stationary or in motion.

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

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

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

A weatherproof digital Quadra meter containing the volt, amp, and frequency shall be installed near the breaker panel.

GENERATOR PTO

A hot shift PTO shall be provided on the transmission for the Harrison generator. The PTO shall be controlled from the cab. The control shall include a PTO engagement switch and a PTO engaged indicator light.

GENERATOR WARRANTY

The specified generator shall have a two (2) year or two thousand (2000) hour warranty as provided by the generator manufacturer. A copy of the generator warranty shall be provided at time of delivery.

The generator shall be mounted above the pump enclosure on the officer's side.

Locating the generator greater than 144" from the main breaker panel may require the installation of an additional power disconnecting means.

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LOAD CENTER

The generator output line conductors shall be wired from the generator output connections to a Square D, Model #QO120L125G breaker panel. The breaker panel shall be equipped with a properly sized main breaker using two (2) of the twenty (20) spaces, which leaves a total of eighteen (18) available spaces.

The generator output conductors shall be sized to 115% of the main breaker rating and shall be installed as indicated in the wiring section.

Eighteen (18) appropriately sized, 120 volt, circuit breakers shall be provided.

The breaker panel shall be located on the rear wall of the driver's side front compartment.

WIRING METHODS

Wiring/conduit shall not be attached to any chassis suspension components, water or fuel lines, air or air brake lines, fire pump piping, hydraulic lines, exhaust system components or low voltage wiring.

All wiring shall be installed at a minimum of 12 inches away from any exhaust piping and a minimum of 6 inches from any fuel lines.

All wiring shall be securely clamped within 6 inches of any junction box and at a minimum of every 24 inches of run. All supports shall be of nonmetallic material or corrosion protected metal. All supports shall not cut or abrade conduit or cable and shall be mechanically fastened to the vehicle.

All power supply assembly conductors, including neutral and grounding conductors, shall have an equivalent amperage rating and shall be sized to carry not less than 115% of the main breaker rating.

All Type SO or Type SEO cable not installed in a compartment shall be installed in wire loom. Where Type SO or Type SEO cable penetrates a metal surface, a rubber or plastic grommet or bushing shall be provided.

The installation of all 120/240 wiring shall meet the current NFPA-1901 Standards (NO EXCEPTIONS).

WIRING IDENTIFICATION

All line voltage conductors located inside the main breaker panel box shall be individually and permanently identified. When prewiring for future power wiring installations, the non-terminated ends shall be labeled showing function and wire size.

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GROUNDING

The neutral conductor of the power source shall be bonded to the vehicle frame only at the power source.

The grounded current carrying conductor (neutral) shall be insulated from the equipment grounding conductors and from the equipment enclosures and other grounded parts. The neutral conductor shall be colored white or gray.

In addition to the bonding required for the lower voltage return current, each body and driving/crew compartment enclosure shall be bonded to the vehicle frame by a copper conductor. The conductor shall have a minimum amperage rating of 115 percent of the name plate current rating of the power source specification label.

CIRCUIT BREAKER/RECEPTACLE INSTALLATION

The system shall be installed by highly qualified electrical technicians to assure the required level of safety and protection to the fire apparatus operators. When multiple circuits are required, the circuits shall be wired to the breaker panel in a staggered configuration to minimize electrical loads on each breaker or generator (leg) circuit. The wiring, electrical fixtures and components shall be to the highest industry quality standards available on the domestic market. The equipment shall be the type as designed for mobile type installations subject to vibration, moisture and severe continuous usage.

RECEPTACLE INSTALLATIONS

Any receptacle installed in a wet location must be a minimum of 24 inches above the ground and provided with an approved wet location cover. Wet receptacles may not be mounted at more than 45 degrees from vertical, nor can they be mounted in a face-up position.

Four (4) 110 volt, NEMA L5-15, 15 amp, duplex twist-lock receptacles with a gray thermoplastic, corrosion resistant, weatherproof covers shall be installed as directed by the Fire Department. These receptacles shall require one (1) 15 amp, 110 volt circuit breaker each to be installed in the load center.

Four (4) 110 volt, NEMA 5-15, 15 amp, duplex receptacles with a gray thermoplastic, corrosion resistant, weatherproof covers shall be installed in the cab as directed by the Fire Department. These receptacles shall require one (1) 15 amp, 110 volt circuit breaker each to be installed in the load center.

One (1) 220 volt, NEMA L6-30, 30 amp, single twist-lock receptacle with a gray thermoplastic, corrosion resistant, weatherproof cover shall be installed in the rear step compartment as directed by the Fire Department. This receptacle shall require one (1) 30 amp, 220 volt circuit breaker to be installed in the load center.

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TRANSFER SWITCH

An automatic power relay shall be installed to allow interior 110 volt accessories to be powered by the 120 volt shoreline or the generator. The interior accessories to be powered by the shoreline shall be wired through a separate sub-panel breaker box. This will allow for a continuous power supply to the interior accessories while the apparatus is parked in the station. The maximum load for the transfer / relay shall be 20 amps at 110 volts.

ELECTRIC CORD REEL (220 VOLT)

One (1) Hannay Model #ECR-1618-17-18, with 4 conductor collector assembly for 220 volts, with electric rewind cord reel shall be provided and wired to the breaker panel. The reel shall be securely mounted and equipped with a rewind control adjacent to the reel.

The cord reel shall be mounted above the pump enclosure on the driver's side.

The circuit breaker used to protect any device attached to the cord reel shall be sized to the smallest electrical connection used.

ELECTRIC CABLE

Two hundred (200) feet of Type SO yellow 10/4 heavy duty electric cable, wired for 220 volt, shall be provided on the cord reel.

One (1) NEMA L14-20R, 20 amp, four prong twist-lock receptacle(s) shall be provided on the end of the cable.

JUNCTION BOX

One (1) Circle-D Model #PF51G, four (4) outlet junction box with four (4) NEMA L5-15R twist-lock receptacles with 6" pigtail with a NEMA L14-20P twist-lock plug shall be provided.

The junction box shall be wired such that the four (4) outlets provide 120 VAC.

CABLE ROLLER ASSEMBLY

One (1) four (4) roller assembly(s) shall be provided adjacent to each cord reel to provide unobstructed deployment and rewinding of the cable.

One (1) cable ball stop(s) shall be installed on the cable to keep the cable end from passing through the roller assembly.

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LIGHTING (Telescoping) - REAR OF CAB

Two (2) Fire Research OPTIMUM, Model #OPA530 side mounted, push up scene lights, deployable in a full 360 degree rotation shall be provided. The entire assembly shall be UL listed as Scene light for Fire Service Use, manufactured by Fire Research. The tightening mechanism shall be of a twist lock (concentric ring) design, the use of a knob or latch to release the pole in order to raise and lower the telescoping portion of the pole shall not be accepted.

The lights shall be mounted on the rear of the cab, one (1) each side. Wiring used for the lighting shall be a minimum of 16 gauge three (3) wire cable that is properly supported and protected from damage.

Each Fire Research light shall be equipped with a 750 watt Model S75, Optimum lamp head. The bulb shall be easily accessible through the front glass and frame. Changing the bulb should be easily done from the front of the lamp head. The glass and frame must be removable, held onto the lamp assembly by no more than four front screws.

Two (2) Model S75, 750 watt light heads shall require one (1) 120 V, 15 amp circuit breaker.

LIGHTING (Telescoping) - REAR OF BODY

Two (2) Fire Research FOCUS, Model #FC530 side mounted, push up scene lights, deployable in a full 360 degree rotation shall be provided. The entire assembly shall be UL listed as Scene light for Fire Service Use, manufactured by Fire Research. The tightening mechanism shall be of a twist lock (concentric ring) design, the use of a knob or latch to release the pole in order to raise and lower the telescoping portion of the pole shall not be accepted.

The lights shall be mounted on the rear face of the body, one (1) each side **in place of the standard vertically mounted rear grab rails**. Wiring used for the lighting shall be a minimum of 16 gauge three (3) wire cable that is properly supported and protected from damage.

Each Fire Research light shall be equipped with a 750 watt Model S75, FOCUS™ lamp head. The small, low-profile lamp head shall be no larger than 3.5" high and shall actively direct 50 percent of the light from a quartz bulb onto the action area while still providing 50% illumination in the working area. The bulb shall be easily accessible through the front glass and frame. Changing the bulb should be easily done from the front of the lamp head. The glass and frame must be removable, held onto the lamp assembly by no more than four front screws.

Two (2) Model S75, 750 watt light heads shall require one (1) 120 V, 15 amp circuit breaker.

QUARTZ LIGHTS REAR OF CAB SWITCHING

The quartz lights on the rear of the cab shall be wired through the circuit breaker panel and

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switched from the breaker panel via the circuit breakers.

QUARTZ LIGHTS REAR OF BODY SWITCHING

The quartz lights on the rear of the body shall be wired through the circuit breaker panel and switched from the breaker panel via the circuit breakers.

WILL-BURT CHIEF LIGHT TOWER

A Will-Burt Nightscan Chief, Model NS6-3000OPT surface mounted light tower shall be provided and mounted as specified.

The light tower shall be equipped with two (2) 1500-watt, 240-volt quartz halogen FRC Optimum light fixtures to provide a total of 3,000 watts of lighting. The light tower uses an RCP (Remote Control Positioner) attached to the top of the tower to allow full rotation and tilt of the light fixtures at any vertical height to ensure total scene coverage above or beside the vehicle. The light tower extends to a maximum height of six (6) feet from the mounted surface.

The light tower's functions including "auto stow," are operated by a pistol grip remote control hardwired into the tower. The remote control shall be mounted in a body compartment as specified.

The two (2) 1500-watt light heads shall require one (1) 240-volt, two pole 15-amp circuit breaker.

The light tower be mounted at the front of the hose bed above the "L" section of the booster tank.

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LADDER STORAGE RACK (OFFICER SIDE)

An electronically controlled swing, down ladder rack, manufactured by the Ziamatic Corporation shall be provided. The ladders shall be stored vertically above the compartments on the officer side of the apparatus. The Ziamatic ladder rack is operated by two (2) Warner Electric linear actuators. Each actuator includes a built in safety slip clutch.

The actuator switch for the ladder rack shall be located on the officer side pump panel area in an enclosed housing, whereas the operator shall have full view of the rack during the raising or lowering operation. A warning alarm shall activate when the rack is in motion, the warning light shall be located on the officer side rear body panel. A flashing warning light shall be provided on the cab dash to indicate when the rack is not in the raised travel position. An interlock system shall be provided whereas if any compartment door on the officer side of the body is open, the rack shall not operate.

LADDERS

The following Alco-Lite ground ladder compliment shall be provided:

- One (1) Alco-Lite Model PEL-24; 24', aluminum, two (2) section extension ladder shall be provided.
- One (1) Alco-Lite Model PRL-14; 14', aluminum, straight roof ladder with folding hooks shall be provided.
- One (1) Alco-Lite Model FL-10; 10', folding, aluminum, attic ladder shall be provided.

PIKE POLE STORAGE

Four (4) pike pole tubes shall be provided. Each holder shall be equipped with a spring type holder and shall be accessible from the rear of the apparatus. Each pike pole holder shall be labeled to indicated the pike pole length.

The pike pole tubes shall be mounted on top of the officer's side compartment cap.

PIKE POLES

Three (3) Fire Hooks Unlimited pike poles shall be provided in the following configuration:

- 1 - Six (6) foot Fire Hooks RH6 pike pole with fiberglass handle
- 1 - Eight (8) foot Fire Hooks RH8 pike pole with fiberglass handle
- 1 - Ten (10) foot Fire Hooks RH10 pike pole with fiberglass handle

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SUCTION HOSE STORAGE

The suction hoses shall be located on the body side panels, one (1) on the officer's side and one (1) on the driver's side of the apparatus.

HOSE TROUGHS

Two (2) polished, extruded aluminum adjustable hose troughs shall be provided to accommodate the suction hoses. Two (2) Velcro hose holders shall be furnished on each trough.

SUCTION HOSE

Two (2) 10 foot sections of six (6) inch PVC lightweight suction hose shall be furnished (Kochek or Firequip Maxi-Flex). Suction hose shall be for suction only and not to be used on pressurized hydrants or for relay pumping. Couplings shall include a long handle, female swivel on one end and a rocker lug male on the other end. All threads shall be six (6) inch N.S.T.

NOTE: All PVC suction hoses are strictly drafting hoses and must not be used on hydrants or in pressure applications, as serious personal injury or death may occur.

STRAINER

One (1) 6" NST barrel type strainers shall be provided to attach to the suction hose. A compartment mounting bracket shall also be provided to store the strainers when not in use.

ADDITIONAL ITEMS SUPPLIED WITH THE VEHICLE

- 1 - Pint of touch up paint for each color
- 1 -Bag of assorted stainless steel nuts and bolts

LOOSE EQUIPMENT

The following items shall be provided and shipped loose with the completed apparatus at the time of delivery:

- One (1) Boston rake with mounting brackets
- One (1) 6 lb. flathead axes with fiberglass handles with mounting brackets
- One (1) 6 lb. pick head axes with fiberglass handles with mounting brackets

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- One (1) Amerex A411, 20 pound ABC dry chemical extinguishers w/bracket
- One (1) Amerex 331, 20 pound CO2 extinguishers w/bracket
- One (1) bright yellow Skull Saver
- Four (4) Red Head Model 148-3 wrench/holder combination sets.

WHEEL CHOCKS

Two (2) ZICO #SAC-44 wheel chocks shall be mounted forward of the rear wheels on the driver side below the side running board compartments.

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PAINT, PREPARATION AND FINISH

The PPG Delta, Low V.O.C., polyurethane finishing system, or equal, shall be utilized. A "Clear Coat" paint finish shall be supplied to provide greater protection to the quality of the exterior paint finish.

All removable items, such as brackets, compartment doors, etc. shall be painted separately to insure finish paint behind mounted items. All compartment unwelded seams exposed to high moisture environments shall be sealed using permanent pliable caulking prior to finish paint.

BODY PRIMER & PREPARATION

All exposed welds shall be ground smooth for final finishing of areas to be painted. The compartments and doors are totally degreased and phosphatized. After final body work is completed, grinding (36 and 80 grit), and finish sanding shall be used in preparation for priming.

BODY FINISH PAINT

The body shall be finish sanded and prepared for final paint. Upon completion of final preparation, the body shall be painted utilizing the highest quality, state of the art, low V.O.C., polyurethane base paint. Finish paint shall be applied in multiple coats to ensure proper paint coverage with a high gloss finish.

The entire body shall be buffed and detailed.

"TUF-KOTE" UNDER SEAL

The under side of the apparatus shall have Tectyl # 518 film applied to retard rust and the corrosion process. The product shall meet military Specification A-A-59295 Type 1. The amber, semi-firm wax film shall be applied by air spray method. The cure time is 24 hours. The film shall be applied to the chassis major components such as: chassis frame rails and cross members, axles, springs, driveline components, lower radiator supports, fuel tank, air tanks, running boards, bumper apron and other related components.

The under side of the cab and body shall have the film applied to the following areas: cab steps, front gravel shield and underside of battery box, body substructure, underside of all body compartments, running board supports and rear step supports. No film shall be applied to the exhaust system or cab wheel wells, or body rear wheel wells.

NOTE: The film shall remain semi-firm to promote self-sealing. The film may leave a light amber cast to those areas treated.

The inside and underside of the complete body assembly shall be painted job color prior to installation of the body on the chassis.

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The interior of the aluminum body compartments shall have an unpainted "DA" finish inside. All seams shall be caulked with a clear silicone type caulking.

The body paint finish shall be PPG Delta System in a single color, to match customer furnished paint codes and requirements.

The pump enclosure and pump/plumbing within the pump enclosure shall be painted job color to match the primary color of the body.

CAB PRIMER & PREPARATION

The cab primer shall be a two (2) stage process. First stage shall be a coating with a two part component, self etching, corrosion resistant primer to chemically bond the surface of the metal for increased adhesion. Second stage shall be multiple coats of a catalyzed, two component polyurethane, primer applied for leveling of small imperfections and top coat sealing.

CAB FINISH PAINT

The entire cab shall be finish sanded and prepared for final paint. Upon completion of final preparation, the cab shall be painted utilizing the highest quality, state of the art, low V.O.C., polyurethane base paint. Finish paint shall be applied in multiple coats to ensure proper paint coverage with a high gloss finish.

The cab exterior shall be painted with PPG Delta system to match purchaser's furnished paint codes. A two-tone paint finish shall be provided with the two-tone break line located approximately 3" below the cab side windows.

The entire exterior finish of the cab shall be buffed and detailed.

CAB INTERIOR PAINT

The interior metal surfaces of the cab shall be finish painted with a textured gray paint.

CHASSIS PAINT

The chassis frame rails, running gear, pump and plumbing shall be painted with Polyurethane paint to match the body color code prior to the installation of any air lines or electrical system to ensure serviceability.

PAINT CODES

Antietam Fire Apparatus, Inc.

The paint shall match customer furnished paint code(s) and layout. The paint code(s) shall be as indicated below:

- **PRIMARY PAINT COLOR**

SINGLE COLOR: RED Sikkens Autocote LV PAINT CODE # FLNA 3225

- **SECONDARY PAINT COLOR**

TWO/TONE COLOR: WHITE Sikkens Autocote LV PAINT CODE # FLNA 4006

Color match to be determined at pre-construction based on Fire Department provided paint codes from existing vehicles.

TOUCH-UP PAINT

One (1) pint of each exterior color paint for touch-up purposes shall be supplied when the apparatus is delivered to the end user.

FINALIZATION & DETAILING

Prior to delivery the vehicle, the interior and exterior be cleaned and detailed. The finalization process detailing shall include installation of NFPA required labels, checking fluid levels, sealing and caulking required areas of the cab and body, rust proofing, paint touch-up, etc.

RUST PROOFING

The entire unit shall be thoroughly rust proofed utilizing rustproof and sound deadening materials applied in manufacturer recommended application procedures. Rust proofing shall be applied during the assembly process and upon completion to insure proper coverage in all critical areas.

COMPUTER GENERATED LETTERING

The lettering and striping shall be custom designed utilizing state of the art computer software and computerized cutting machines. The manufacture shall employ a full time artist / designer to generate all lettering, decals, and striping to meet the requirements of the Fire Department. The art work for the lettering and striping shall be kept on record by the apparatus manufacturer to allow for ease in duplication for the Fire Department.

Antietam Fire Apparatus, Inc.

LETTERING

Scotch-Lite with drop shadow lettering shall be provided. A minimum of sixty (60) 3" letters shall be provided.

LETTERING FONT

The lettering shall be designed and cut with a basic block type font:

"BLOCK TYPE FONT"

SCOTCH-LITE STRIPE

An ten (10) inch high "Scotch-Lite" stripe shall be provided. The stripe shall be applied on a minimum of 60 percent of each side of the unit, 60 percent on the rear of the unit and 40 percent on the front of the unit. The Scotch-Lite stripe layout shall be determined by the Fire Department.

The Scotch-Lite shall be white in color.

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VEHICLE WARRANTY

The proposed vehicle includes a one (1) year new vehicle warranty, upon delivery and acceptance of the vehicle. The warranty will ensure that the vehicle has been manufactured to the proposed contract specifications and will be free from defects in material and workmanship that may appear under normal use and service within the warranty period. The warranty may be subject to different time and mileage limitations for specific components and parts. This warranty is issued to the original purchaser of the vehicle.

The warranty will not apply to tires, batteries, or other parts or components that are warranted directly by their manufacturers. The warranty will not apply to routine maintenance requirements as described in the service and operator's manual. No warranty whether express, implied, statutory or otherwise including, but not limited to any warranty of merchantability or fitness for purpose will be imposed.

COMPONENT WARRANTY INTERVALS OVERALL UNIT AND CUSTOM CHASSIS

All components and parts of the vehicle are warranted for a period of one (1) year from acceptance of the vehicle, unless excluded elsewhere in this warranty or described as having longer time limitations.

ENGINE WARRANTY

The unit will be equipped with a Fire Service rated engine, which will come furnished with a five (5) year Engine Manufacturer's warranty. A copy of the manufacturer's warranty will be supplied to define additional details of the warranty provisions.

TRANSMISSION WARRANTY

The required Allison transmission shall be provided with a five (5) year warranty. A copy of the Allison transmission warranty shall be supplied to the purchaser to define additional details of the warranty provisions.

CUSTOM CHASSIS FRAME RAILS

The proposed KME custom chassis frame and cross members will be warranted for an unlimited time period. A copy of KME's frame rail warranty will be supplied to define additional details of the warranty provisions.

CROSS MEMBERS WARRANTY

A lifetime warranty will be provided on all chassis frame cross members.

Antietam Fire Apparatus, Inc.

MERITOR AXLE WARRANTY

The Meritor axle/s will be provided with a two (2) year parts and labor warranty. The wheel seals, gaskets and wheel bearings will have a one (1) year warranty. A copy of Meritor's warranty will be supplied to define additional details of the warranty provisions.

CAB STRUCTURE WARRANTY

The proposed cab will be warranted against structural defects for a period of ten (10) years from the date of acceptance of the unit. Details of warranty coverage, limitations and exclusions are included in the specific warranty document.

BODY STRUCTURE WARRANTY

The proposed body will be warranted against structural defects for a period of ten (10) years from the date of acceptance of the unit. Details of warranty coverage, limitations and exclusions are included in the specific warranty document.

CORROSION WARRANTY

The proposed cab and body will be warranted against rust-through or perforation, due to corrosion from within, for a period of ten (10) years. Perforation is defined as a condition in which an actual hole occurs in a sheet metal panel due to rust or corrosion from within. Surface rust or corrosion caused by chips or scratches in the paint are not covered by this warranty.

PAINT FINISH WARRANTY

The paint finish will be warranted for a period of seven (7) years from the date of acceptance of the unit. Details of warranty coverage, limitations and exclusions are included in the specific warranty document.

WATER TANK (LIFETIME)

The proposed water tank will be warranted by the water tank manufacturer for the "Lifetime" of the unit. A copy of the manufacturer's warranty will be supplied to define additional details of the warranty provisions.

WATEROUS FIRE PUMP (FIVE YEAR LIMITED)

The proposed Waterous fire pump will be warranted by the pump manufacturer for a period of Five (5) years. The warranty will cover replacement parts and labor, only for the warranted components. A copy of the manufacturer's warranty will be supplied to define additional details of the warranty provisions.