

INCORPORATED VILLAGE OF MALVERNE

NOTICE TO BIDDERS INFORMATION FOR BIDDERS SPECIFICATIONS FOR ONE-(1) 2000 GPM RESCUE PUMPER

NOTICE IS HEREBY GIVEN, that the Village of Malverne will accept sealed bids for ONE (1) 2000 GPM RESCUE PUMPER to be utilized by the Malverne Volunteer Fire Department. Sealed bids shall be received by the Village Clerk, Village of Malverne, 99 Church Street, Malverne, NY 11565, no later than March 12, 2025 at 11:00AM at which time they will be opened and read aloud. Specifications and bidder instructions may be obtained on or after February 10, 2025 in the office of the Village Clerk or at www.malvernevillage.org/request-for-proposals-qualification . For additional information email info@malvernevillage.org. No bid will be considered valid if exceptions are noted upon view of the submitted document.

The Board of Trustees reserves the right to reject any and all bids, to waive any non-conformity there in, and to accept the bid which in their opinion is in the best interest of the Village.

BY ORDER OF THE BOARD OF TRUSTEES
Inc. Village of Malverne
Jill Valli, Village Clerk
Dated February 6, 2025

INVITATION TO BID

Sealed bids will be received by the VILLAGE OF MALVERNE for the furnishing of all necessary labor, equipment and material for one-(1) new, 2000 GPM rescue-pumper apparatus with seating for eight-(8) firefighters and related equipment as outlined in the following specifications.

In addition to the original copy of the bid proposal to be provided, two-(2) additional duplicate copies, each marked “COPY”, shall be provided for use during bid review by the Village. Electronic copies will also be accepted if available.

This specification shall govern the construction of the apparatus, unless properly documented exceptions or deviations are approved by the Village of Malverne. Major exceptions to these specifications will not be accepted.

Any exceptions or variations to these specifications must be set forth on separate sheets, indicating page number(s) of the published specifications, and must be submitted with the bid. Any bids deemed as taking total exception to these specifications will result in rejection of the bid.

Submit only one (1) bid that meets or exceeds the minimum specifications herewith. No substitutes, demo units, stock units or alternates will be permissible unless such units are requested later in the specifications.

No prototype apparatus will be considered. All design, operational and material features of the apparatus proposed must fully comply with the State and Federal Motor Vehicle Safety Standards.

Each bidder will supply a pumper apparatus that conforms to the current edition of the National Fire Protection Association Pamphlet No. 1901.

The bidder will make accurate statements as to the apparatus weight and dimensions. All bids will include a complete set of detailed manufacturer's specifications. The Purchaser's standards for bidding Automotive Fire Apparatus must be strictly adhered to and all bid forms and questions must be completed and submitted with the bid. Omissions and variations will result in immediate rejection of the bid.

The competency and responsibility of the bidder(s) will be considered prior to award. The Village reserves the right to reject any or all bids, or to reject the bid of a bidder who, in the judgment of the buying authority, is not in a position to perform the Contract. These specifications, together with any other documents required herein, will be included in the final contract. Each bidder will submit a copy of his proposed contract form. The purchaser reserves the right to reject a bid based on unacceptable provisions of a bidder's contract and does not obligate itself to accept the lowest or any bid.

It will be the responsibility of the bidder to ensure that their proposal arrives at the proper location by the time indicated. Late proposals, telegrams, facsimile, email or telephone bids will not be considered. Bids will not be considered from firms, individuals or the same owners of separate companies submitting more than one bid.

Any erasures, strike-over's and/or changes to prices written in numerals should be initialed by the bidder. Failure to initial may be cause to reject the bid as irregular and disqualified from consideration.

If a vendor represents more than one Fire Apparatus Manufacturer, they will only bid the top of the line that meets specifications.

The purchaser shall decide which bid is in the best interest of the purchaser and will not accept any bids which do not meet these specifications.

INFORMATION REQUIRED WITH BID

The fire apparatus and equipment to be furnished in meeting these specifications must be the product of an established reputable fire apparatus manufacturer of five (5) years or more. Each bidder will furnish satisfactory evidence of the manufacturer's ability to construct, supply service, parts and technical assistance for the apparatus specified. The bidder must state the location of the factory and full-service center.

The general construction of the apparatus will give due consideration to the nature and distribution of the load to be sustained and the general character of the service to which the apparatus is to be subjected when placed in service.

Each bidder must submit the forms found at page 100 of this document: **Village of Malverne Bid Form, non-collusion certification, indemnification agreement and a detailed proposal**, which accurately specifies the construction method to be used in the apparatus. The purchaser will utilize this proposal to compare the unit proposed with the specifications. To facilitate comparison all bid proposal specifications will be submitted in the same sequence as the advertised specification for ease of comparison. Any bidder who fails to submit a set of construction specifications, or who photocopies and submits these specifications as their own construction details will be considered non-responsive. This will render such proposal ineligible for award.

PAYMENT TERMS

All bidders will be required to detail in exact terms of payment for said apparatus in their proposal.

VEHICLE STABILITY

The height of the fully loaded vehicle's center of gravity will not exceed the chassis manufacturer maximum.

The front to rear weight distribution of the fully loaded vehicle will be within the limits set by the chassis manufacturer. The front axle loads will not be less than the minimum axle loads specified by the chassis manufacturer, under full load and all other loading conditions.

The difference in weight on the end of each axle, from side to side, when the vehicle is fully loaded and equipped shall not exceed 7%.

PERFORMANCE TEST AND REQUIREMENTS

The apparatus will meet the performance requirements at elevations of 2000 feet (610m) above sea level.

The apparatus will meet the performance requirements while stationary on any grade of up to and including 6% in any direction.

From a standing start, the vehicle will attain a true speed of 35 mph (56 km/h), within 25 seconds on a level road.

The apparatus will obtain a minimum top speed of 50 mph (80 km/h) on a level road.

The apparatus will be able to maintain a speed of at least 20 mph (32 km/h), on any grade up to and including 6%.

The apparatus will be tested and approved by Underwriters Laboratories Incorporated in accordance with the standard practices for pumping engines.

ROAD TEST

Each manufacturer will conduct road test to verify that the complete apparatus is capable of compliance:

- The test will be conducted on a dry, level, paved road that is in good condition. The engine will not operate in excess of the maximum no load governed speed.
- Acceleration test will consist of two runs in opposite direction over the same route.
- The vehicle will attain a true speed of 35 mph (56 km/h) from a standing start within 25 seconds.
- The vehicle will attain a minimum top speed of not less than 50 mph (80 km/h).

The apparatus manufacturers will road test the system to confirm that the auxiliary braking system is functioning as intended by the auxiliary braking system manufacturer.

The service brakes will bring the fully laden apparatus to a complete stop from an initial speed of 20 mph (32 km/h) in a distance not exceeding 35 feet (10.7M) by actual measurement, on a substantially hard, level surface road that is free of loose material, oil, or grease.

FAILURE TO MEET TEST

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

PRODUCT LIABILITY

Each bidder will supply proof of product liability and facility insurance equal to or exceeding \$1,000,000.00.

INFORMATION/CERTIFICATIONS

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

- The manufacturer's record of apparatus construction details, including the following information:
 - Owner's name and address
 - Apparatus manufacturer, model, and serial number
 - Chassis make, model, and serial number
 - GVWR of front and rear axles

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- Front tire size and total rated capacity in pounds (kilograms)
 - Rear tire size and total rated capacity in pounds (kilograms)
 - Chassis weight distribution in pounds (kilograms) with water and manufacturer-mounted equipment (front and rear)
 - Engine make, model, and serial number, rated horsepower, related speed and governed speed
 - Type of fuel and fuel tank capacity
 - Electrical system voltage and alternator output in amps
 - Battery make, model, and capacity in cold cranking amps (CCA)
 - Chassis transmission make, model, and serial number; and if so equipped, chassis transmission PTO(s) make, model, and gear ratio
 - Pump make, model, rated capacity in gallons per minute (liters per minute where applicable), and serial number
 - Pump transmission make, model, serial number, and gear ratio
 - Water tank certified capacity in gallons or liters
 - Paint manufacturer and paint number(s)
 - Company name and signature of responsible company representative
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- 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 manufacturer's certified brake horsepower curve for the engine furnished, showing the maximum governed speed
 - The pump manufacturer's certification of the hydrostatic test
 - The certification of inspection and test for the fire pump
 - The certification of the test for the fixed power source
 - Weight documents from a certified scale showing actual loading on the front axle, rear axle(s), and overall fire apparatus. The available payload for equipment and personnel will be supplied with the bid.
 - Written load analysis and results of the electrical system performance tests required in Chapter 13
 - The certification of water tank capacity

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

- (1) Manufacturer's name and address
- (2) Country of manufacture
- (3) Source for service and technical information
- (4) Parts replacement information
- (5) Descriptions, specifications, and ratings of the chassis and pump
- (6) Wiring diagrams for low voltage and line voltage systems to include the following information:

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- (a) Pictorial representations of circuit logic for all electrical components and wiring
 - (b) Circuit identification
 - (c) Connector pin identification
 - (d) Zone location of electrical components
 - (e) Safety interlocks
 - (f) Alternator-battery power distribution circuits
 - (g) Input/output assignment sheets or equivalent circuit logic implemented in multiplexing systems
- (7) Lubrication charts
 - (8) Operating instructions for the chassis, any major components such as a pump or aerial device, and any auxiliary systems
 - (9) Instructions regarding the frequency and procedure for recommended maintenance
 - (10) Overall apparatus operating instructions
 - (11) Safety considerations
 - (12) Limitations of use
 - (13) Inspection procedures
 - (14) Recommended service procedures
 - (15) Troubleshooting guide
 - (16) Apparatus body, chassis, and other component manufacturer's warranties
 - (17) Special data required by this standard
 - (18) Copies of required manufacturer test data or reports, manufacturer certifications, and independent third-party certifications of test results
 - (19) A material safety data sheet (MSDS) for any fluid that is specified for use on the apparatus
 - (20) One-(1) copy of the latest edition of FAMA's Fire Apparatus Safety Guide

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

LETTER OF AUTHORIZATION

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

LICENSES

Each proposal must have all current licenses required by State law to do business in the State. This is to include BOTH the automotive manufacturer and automotive dealer licenses if required by State law. If the proposed is a manufacturer, bidding direct and not through a dealer or distributor, then the proposal will include copies of their manufacturer and automotive dealer licenses. If the proposed is a dealer or distributor, then they will submit a copy of the appropriate dealer license. Proposals failing to meet this legal requirement cannot be considered.

LIABILITY

The bidder, if his/her bid is accepted will defend against all suits, and assume all liability for the use of any patented process, advice or article forming a part of the apparatus of any appliance furnished under contract.

SERVICE AND WARRANTY SUPPORT

TO ENSURE FULL DEALER SUPPORT FOR SERVICE AFTER THE SALE, THE SELLING DEALER MUST BE CAPABLE OF PROVIDING FULL FACTORY SERVICE WHEN REQUIRED.

In an effort to ensure that prompt, knowledgeable and professional representation is made on behalf of the manufacturer, the manufacturer must maintain a dealer within a reasonable distance from the purchaser. This representative must be competent and knowledgeable with respect to the sale and service of fire apparatus and emergency vehicles.

SPECIFICATIONS

SINGLE SOURCE MANUFACTURER

To provide the customer with a single point of contact for service, warranty, and parts, proposals will only be accepted from manufacturers who assemble the complete apparatus in their own facility.

VIRTUAL MANUFACTURING

The manufacturer will have a web site available for the customers to watch their unit being produced. The "Trucks in Production" photos will be updated as progress has been made to the unit.

Customer will be able to access the web site without the requirement of a password.

PRINCIPAL DIMENSIONS

The apparatus shall have the following dimensions:

- Maximum Allowable Overall Length: 34 Ft 6 In. (414")
- Maximum Allowable Overall Height: NOT TO EXCEED 126"

CERTIFIED WELDERS

The manufacturer will employ individuals that are certified aluminum and stainless-steel welders. The welders will be certified by an outside testing laboratory. The certifications will be available for viewing through the Human Resources office upon request.

DRAWING. PROPOSAL

There will be a proposal drawing submitted to the Fire Department. This drawing will be a visual interpretation of the apparatus proposed.

DRAWING. APPROVAL

Prior to construction, the contractor will provide three-(3) approval drawings of the apparatus for the fire department's review. The drawings will show such items as the chassis being utilized, lights, horns, sirens, pump panels, and all compartment locations and dimensions. The blueprint will be a visual interpretation of the unit as it is to be constructed, In the event of discrepancies on the print the specifications will prevail. The buying authority will sign all drawings. One-(1) print will be retained by the Fire Department, the dealer/sales representative will retain one-(1) print, and one-(1) print will be returned to the manufacturer.

In addition to the approval drawings above, the following additional approval drawings shall be provided:

- **Cab dash and switch panel layouts**
- **Cab seating layout including the crew cab overhead compartments**
- **Front bumper layout showing tray(s), compartment(s), winch, tow eyes, air horns, speaker and siren, winch and any other accessories.**

DRAWING. PUMP PANEL

A detailed drawing of the pump panels will be provided for Fire Department approval before construction. The drawing will include all of the gauges and controls located on the pump operator's panel.

PRE-CONSTRUCTION CONFERENCE

A pre-construction conference will be held at the factory prior to the actual construction of the vehicle. The conference will be held in the manufacturer's facility with six (6) representatives of the buying authority and appropriate representatives of the manufacturer. **Transportation, lodging and meals will be the responsibility of the contractor.**

INSPECTION TRIP. MID

There will be a mid-inspection for three (3) representatives of the buying authority at the facility where the apparatus is being constructed. **The mid-inspection trip will be held when the cab is complete and the body mounted to the chassis, ready for paint. Transportation, lodging and meals will be the responsibility of the contractor.**

INSPECTION TRIP. FINAL

There will be a final inspection for six (6) representatives of the buying authority at the facility where the apparatus is being constructed. The inspection trip will be completed when the apparatus is complete and ready for delivery. Factory and Sales representatives will be available at the time of inspection. **Transportation, lodging and meals will be the responsibility of the contractor.**

TRANSPORTATION

To ensure proper break-in of all components while still under warranty, the apparatus will be delivered over the road under its own power (Rail and/or truck freight will not be acceptable).

The manufacturer or local dealer will be responsible for driving the completed apparatus back to the station and into assigned bay.

DELIVERY TIME

The contractor shall specify the delivery schedule for the apparatus.

DELIVERY AND ACCEPTANCE

The apparatus must be backed inside the firehouse in its assigned bay to be considered accepted. Inspection of the firehouse to verify the apparatus bay door height and width and interior ceiling height can be made upon request.

VEHICLE FAMILIARIZATION & DEMONSTRATION

Familiarization and demonstration of the vehicle will be by a competent and qualified person as defined in the current standard of NFPA 1900 standard.

Familiarization of the vehicle will include the following:

How to locate gauges or indicators and check all fluid levels and operational issues of the vehicle

How to tilt the chassis cab or hood assembly for access to the engine, fire pump, or aerial control, or any other device to allow access to fluids or for required maintenance

Interior cab controls, instruments, mirrors, safety devices or alarms, brake operations, transmission control, pump controls, exhaust regeneration (if provided), seat adjustments, warning light engagement, and other operational equipment

If the apparatus is provided with a fire pump system, the following minimum instructions:

- Setting of parking brake, proper transmission gear, and fire pump engagement operations
- Throttle control
- Primer and tank-to-pump operation
- Use of pressure control devices
- Tank refilling operations
- Proper operation of discharge controls
- Proper shutdown and draining of system

If the apparatus is provided with a generator, the following minimum instructions

- Proper engagement if driven by the chassis
- Startup, operation, and shutdown of generator
- Monitoring of controls and instruments

If the apparatus is provided with a foam system, the following minimum instructions:

- Startup, operation, and shutdown of foam system
- Setting of foam percentages and other operational settings
- Proper flushing and draining of the system

If the apparatus is provided with a water tower or aerial device, the following minimum instructions:

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

CUSTOM CHASSIS

It is the intent of the technical specifications contained herein to ensure the custom cab and chassis specified will be engineered, designed and manufactured exclusively for heavy-duty continuous use in extreme environments and rigorous adverse conditions.

Each custom cab and chassis will be manufactured in strict compliance with all applicable requirements as set forth in the current edition of the NFPA (National Fire Protection Association) pamphlet 1900 with maximum safety as the key focus throughout the design and development phase of each fire and rescue chassis.

CHASSIS FRAME RAILS, FULL LENGTH DOUBLE

The chassis frame rails will be constructed of 110,000-PSI minimum yield steel that has been formed into a "C" channel shape with dimension of 10.50" x 3.50" x .375 inches.

A full-length inner frame liner of 110,000 Pound minimum yield with dimension of 9.69" x 3.13" x .313" will be provided for additional strength and to reduce deflection.

The resulting frame system will have a minimum section modulus of 28.50 cubic inches with a resisting bending moment of 3,135,498-inch pounds per rail.

The frame rails will be powder coated in order to insure superior paint adhesion. Frame cutouts for the engine will be made with a plasma torch in order to minimize the heat-affected zone caused by the cut.

The left and right-side frame systems will be fastened together using cross members and Grade 8 fasteners.

PAINT, FRAME RAIL

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

This corrosion prevention system is designed to repel deicing agents commonly used on winter roadways. Moving parts, such as steering linkages, cab locks, spring suspensions, axles, etc., shall not be coated with this material, but shall be painted with high quality gloss black paint.

The color of the coating shall be job color red.

TOW EYES, FRONT

Two-(2) heavy-duty painted tow eyes will be mounted up thru the front bumper gravelshield fabricated from 1" thick steel. The tow eyes will have an inside eye diameter of 3" with a radius inside edge. The tow eyes will be attached with Grade 8 bolts.

Tilted forward FDNY Style, mounted so they do not extend beyond the front surface of the front bumper.

The tow eyes shall be painted job color red.

FRONT BUMPER

There will be a 100,000-psi high tensile strength painted steel bumper provided fabricated from 10-1/2" x 3-1/2" x .375" steel bolted to the chassis frame rails utilizing grade 8 hardware protecting the front of the apparatus during head-on or angled collisions.

The bumper will be painted job color RED.

BUMPER POCKETS, RECESSED

There will be one-(1) recessed pocket on each side of the front bumper ends to allow for mounting of the warning lights.

BUMPER GUIDE POLES

There will be one-(1) chrome guide pole installed on each side of the front bumper wired to the chassis running lights.

The guide poles shall be Bores model 848-211.

LIGHTS, UNDER BUMPER

There will be two-(2) LED lights mounted, one-(1) each side under the front bumper illuminating the area below. The lights will be activated by a switch cab dash panel.

FRONT BUMPER EXTENSION

There will be a 21" front frame extension provided. The extension will be made from heavy-duty steel in both C-channel and tubular shapes. The frame rail extension material will measure 7" high x 3-1/2" wide x .375" wall thickness.

The extension rails will be bolted to the chassis frame rails through reinforcement plates with Grade 8 hardware, backed by the engine mounting cross member.

GRAVELSHIELD

A gravelshield constructed of 1/8" non-skid aluminum tread plate will be installed between the bumper and the front face of the cab affixed using stainless steel bolts.

BUMPER TRAY, OFFICERS SIDE

There shall be a tray installed on top of the bumper gravelshield on the officer's side. The tray shall be fabricated from aluminum and shall be large enough to accommodate 35' of 5" supply hose.

The tray shall be installed so that the 5" hose can be pre-connected to the front suction swivel.

Also, the tray shall be designed and installed in a way that allows the cab to be tilted without hitting the tray.

FLOOR TILE, OFFICER'S SIDE FRONT BUMPER TRAY

The officer's side front bumper tray floor will be covered with modular flooring tile. The flooring tile will be completely removable for cleaning. The color of the tile shall be black.

BUMPER COMPARTMENT, DRIVER'S SIDE

There shall be a compartment in the bumper gravelshield located on the driver's side which may be used as a hose well or equipment storage compartment. The compartment will be constructed 1/8" smooth aluminum and will include drain holes in the bottom corners to allow excess moisture to escape.

The compartment shall be large enough to accommodate 100 ft of 1-3/4" hose with nozzle attached.

FLOOR TILE, DRIVER'S SIDE FRONT BUMPER COMPARTMENT

The driver's side front bumper compartment floor will be covered with modular flooring tile. The flooring tile will be completely removable for cleaning. The color of the tile shall be black.

STRAP(S), DRIVER'S FRONT BUMPER COMPARTMENT

There will be one (1) restraining strap(s) installed over the driver's side bumper compartment to secure the contents.

ELECTRIC WINCH, BUMPER MOUNTED

A Warn electric winch WARN Model 68801 16,500lb capacity will be permanently installed between the front chassis frame extension. The winch will be accessed thru the top of the front bumper. The winch will be equipped with 90' of 7/16" wire rope and forged steel hook. The winch will be controlled by a 12' remote control.

A warning plate permanently affixed in close proximity of the winch will be installed stating manufacturers suggested maximum load rating.

COVER, WINCH

The bumper mounted winch will have a raised hinged aluminum tread plate protective cover. The cover will be secured in the closed position with a latch.

MECHANICAL SIREN

There will be a Federal Signal Q2B electro-mechanical siren surface mounted on the top of the front bumper. The Q2B siren be a streamlined and designed to provide reliable and long-life operation. Siren will be mounted in swing out hinge or fold out hinge as to not impede operation of winch controls.

The siren brake switch will be located within reach of the driver.

The Q2B electro-mechanical will have the traditional chrome finish.

SIREN WIRING

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

SIREN FOOT SWITCHES

Two-(2) foot operated switches will be installed, one-(1) on each side on the driver and officer's side wired to the mechanical siren.

Foot switches shall be Linemaster model 632-S

SWITCH, ADDITIONAL SIREN BRAKE

An additional mechanical siren brake switch will be installed in the officer's dash panel.

AIR HORN, DRIVER'S SIDE

There will be one-(1) Hadley E-Tone air horn installed in compliance with NFPA thru the driver's side front bumper outboard of the frame rails. The air horn will be plumbed to the chassis air supply system thru an air protection valve. The air horn will be trumpet style with a chrome finish on the exterior and a painted finish deep inside the trumpet.

The air horn will be located on the driver's side of the front bumper in position P5.

AIR HORN, PASSENGER'S SIDE

There will be one-(1) Hadley E-Tone air horn installed in compliance with NFPA thru the passenger's side front bumper outboard of the frame rails. The air horn will be plumbed to the chassis air supply system thru an air protection valve. The air horn will be trumpet style with a chrome finish on the exterior and a painted finish deep inside the trumpet.

The air horn will be located on the passenger's side of the front bumper in position P3.

AIR HORN FOOT SWITCH

One-(1) foot operated switch will be installed on officer's side wired to the air horn(s).

Foot switch shall be Linemaster model 632-S

AIR HORN WIRING

The air horns will be active in both the "Scene" and "Response Mode".

SWITCH, HORN / AIR HORN SELECTOR

There will be a horn / air horn selector switch installed in the cab per the approved dash layouts to operate either air horn(s) or chassis electric horn through the horn ring button.

SIREN SPEAKER

There will be one (1) Federal Signal model ES100 100-watt speaker(s) provided wired to the electronic siren.

A Federal Signal stainless steel Electric "F" grille will be provided over the speaker(s).

The speaker will be located on the officer's side of the front bumper in position P6.

FRONT AXLE

The front axle will be a Hendrickson Steertek fabricated box beam axle with an 24,000-pound rating. The axle will be equipped with removable kingpins & oil seals with transparent covers for oil level inspection.

STEERING SYSTEM

The vehicle will be equipped with a Sheppard M110 power steering gear, used in conjunction with a M90 power assist gear. The steering assembly will be rated to statically steer up to a maximum front axle load of up to 23,500-pounds. Relief stops will be provided to reduce system pressure upon full wheel cut. The system will operate mechanically should the hydraulic system fail.

CHASSIS ALIGNMENT

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

FRONT SUSPENSION

The front suspension will be parabolic (taper leaf) spring type, with three-(3) leaves with an 24,000-pound serving rating. The leaves will be a minimum of 4" wide x 56.4" long (flat), with grease fittings for lubrication installed in the spring pins. Axle stops with energy absorbing bumpers will be attached to the chassis frame. Two-(2) ZF Sachs twin-tube shocks will be provided with the front suspension assembly. The shocks will feature multi-stage piston and base valves.

The front suspension shall be painted job color RED.

FRONT BRAKES

The front axle will be equipped with EX-225 air operated disc brakes and ventilated rotors.

CRAMP ANGLE

The cramp angle of the front axle will be 45 degrees.

FRONT TIRES

The front tires will be Michelin 425/65R22.5 Load Range "L" all-weather tread.

The Intermittent Fire Service load capacity will be 24,000 pounds with a speed rating of 65 miles per hour when properly inflated to 120 pounds per square inch.

The Michelin Intermittent Fire Service Rating limits the operation of the emergency vehicle to one-(1) hour of loaded travel with a one-(1) hour cool down prior to another loaded run.

WHEELS. FRONT ALUMINUM

The front wheels will be Alcoa hub piloted, 22-1/2" x 12-1/4" aluminum wheels featuring a mirror polish on the outer face. The hub piloted mounting system will provide easy installation and will include two-piece flange nuts.

The front aluminum wheel will the Alcoa Dura Bright finish option.

WHEEL TRIM. FRONT WHEELS

The front wheels will be provided with nut covers and baby moon hub caps.

MUD FLAPS. FRONT

The front axle mud flaps will be constructed from hard black rubber and installed behind the tires.

REAR AXLE.

The rear axle will be a Meritor RS-30-185 with a 31,500-pound service rating equipped with axle seals.

REAR SUSPENSION

The rear axle suspension will be a Hendrickson FireMaax air ride rated up to 31,000 pounds capacity.

DIFFERENTIAL. REAR AXLE

The rear axle will have a standard differential from the axle manufacturer.

VEHICLE TOP SPEED

The rear axle will be geared for a top speed of 60-62 MPH at governed engine speed.

REAR BRAKES

The rear axle will be equipped with 16-1/2" x 8-5/8" S-Cam air operated brakes with automatic slack adjusters.

BRAKE APPLY CONTROL. OFFICERS SIDE

An auxiliary parking brake (MAXI) control will be installed on the officer's side of the cab on the angled part of the rocker panel housing. This control will give the officer the ability to activate (set) the parking brake in the event of an emergency. This control will be guarded against accidental activation.

A Weldon red LED pilot light will be located near control to indicate activation. Control and pilot light will be permanently labeled.

This system is electrically controlled and if power is turned off or disabled for any reason, it will not affect the releasing of the apparatus parking brake. In addition to engaging the parking brake when the officer's parking brake switch is activated, the cab accelerator will be deactivated (engine speed will return to idle). The cab accelerator will return to an active state when the officers parking brake switch is returned to the normal (open) position.

REAR TIRES

The rear tires will be Michelin 315/80R22.5 Load Range "L" traction tread. The load capacity will be 35,396 pounds with a speed rating of 65 miles per hour when properly inflated to 130 pounds per square inch with steel or aluminum wheels.

The Fire Service rating is defined as no more than 50 miles of continuous operation at maximum load or without stopping for at least 20 minutes. The Emergency vehicle must reduce its speed to no more than 50 MPH after the first 50 miles of travel.

WHEELS, REAR ALUMINUM

The outer rear wheels will be Alcoa hub piloted, 22-1/2" x 9" aluminum wheels with a mirror polished outer surface. The inner rear wheels will be Alcoa hub piloted, 22-1/2" x 9" aluminum wheels with bright machine finish. The hub piloted mounting system will provide easy installation and will include two-piece flange nuts.

The front aluminum wheel will the Alcoa Dura Bright finish option.

WHEEL TRIM, REAR WHEELS

The rear wheels will be provided with nut covers and high-hat hub covers.

EXTENSIONS, VALVE STEM

A set of valve stem extensions will be provided to allow for visual inspection of the LED tire pressure caps on the single rear wheels.

TIRE PRESSURE MONITORING SYSTEM

Each tire installed on the apparatus will be equipped with a tire pressure monitoring device. The device will consist of a valve stem cap to with an LED tire alert to indicate tire pressure conditions. The LED will flash when the tire drops 8 psi below the factory setting.

HOSE AND HARNESS ROUTING

Battery cables, hydraulic hoses and air lines will be routed through the vertical face of the chassis frame rails using bulkhead connectors. The use of grommets through frame rails, as well as running hoses or cables under, over or ahead of the chassis frame rails to achieve positive connections will not be acceptable.

For ease of maintenance, the wiring harnesses, hydraulic hoses and air hoses will be divided down each frame rail. The hydraulic and air hoses will be run, primarily, down the inside of the right-side frame rail, while the electrical harnesses will be run, primarily, down the left side frame rail. Harnesses and hoses will be mounted using rubber coated, stainless steel holders and, where necessary, heat-resistant zip loom.

AIR BRAKE SYSTEM

The air brake system will meet the requirements of FMVSS-121. The system will consist of three-(3) reservoirs with a total capacity of 5100 cubic inches. The system will be of dual circuit and quick build up design powered by an engine mounted gear driven air compressor. The system will be protected by a heated air dryer with heated automatic moisture ejector on the wet tank and quarter turn brass drain valves on the other tanks.

The entire chassis air system will be plumbed utilizing reinforced nylon air lines in conformance to SAE J 844-94, Type B and USDOT standards. All of the airlines will be color coded to correspond with an air system schematic and will be adequately protected from heat and chafing.

Color coding will be as follows:

Blue: Supply Lines

Green: Primary Lines

Red: Secondary Lines

Orange: Park Brake Lines

Yellow: Accessory Lines

Purple: Pump Shift - Supply Line

White: Pump Shift / Road Mode Line

Black: Pump Shift / Pump Mode Line

The compressor discharge will be plumbed with stainless steel braided hose lines with a Teflon lining.

The system will be plumbed using color-coded nylon airlines with push lock style fittings.

ANTI-LOCK BRAKES W/ATC & ELECTRONIC STABILITY CONTROL

The apparatus will have a Wabco ABS-based Electronic Stability Control (ESC), which offers another level of vehicle control. This automatic braking management system reduces the possibility of a side rollover and assists in the directional stability of apparatus. Upon reaching critical lateral acceleration thresholds, the system intervenes to regulate the vehicles deceleration and braking functions. Reducing the engine's RPM by overriding the foot throttle input and applying the engine retarder (if equipped) to slow the apparatus giving the driver added control and maneuverability. The ESC will also apply braking power to selective wheel of the front and rear axles to assist in stabilizing the apparatus to its intended direction. This selective braking application and reduction of speed and torque reduces the possibility of spinouts and side rollovers even in adverse conditions.

The system includes a Wabco 4-channel Anti-Lock Braking System will be installed which includes four-(4) wheel sensors and four-(4) modulators to control and compensate braking force at each wheel. This system will monitor all wheel ends regardless of suspension type, and which axle it sees braking forces first.

An ABS warning light will be installed on the driver's dash that remains illuminated until the vehicle is moving at least four-(4) miles per hour. An ABS test switch will be installed in the "Diagnostic Information Panel" that when pressed, sends the system into diagnostic mode causing the ABS light to

blink (I/O) indicating a flash code. A listing of flash code definitions is listed in the Wabco Owner's Manual.

Automatic Traction Control (ATC) will be installed to sense wheel slip, apply air pressure to brakes, and reduce engine torque to provide improved traction. An ATC indicator light will illuminate when the system is active.

A mud and snow switch will be provided. When the switch is in the "ON" position, it will allow momentary wheel slip to obtain traction under extreme mud and snow conditions.

The system also includes a Steering Angle Sensor (SAS), which informs the system of the degree in which the steering is turned to one side or the other. Along with the SAS, an ESC module is mounted mid frame at the rear of the chassis cab to detect roll, pitch, and yaw angles and computes which wheel(s) brake(s) will be acted upon.

ACCESSORY AIR TANK(S)

One (1) 1700 cubic inch additional reservoir(s) will be connected to the chassis air system to provide an air supply for accessories such as air powered tools. This reservoir will include a pressure protection valve on the inlet side to allow full use of this tank without draining air from the chassis air system.

HEATED AUTOMATIC MOISTURE EJECTORS

All air reservoirs of the chassis air system will be supplied with completely automatic heated moisture ejectors. The reservoir drain valves will allow the accumulation of contaminants that are collected in the reservoirs to be drained off to the atmosphere.

Moisture ejectors shall be mounted in such a manner as to not reduce ground clearance.

AIR DRYER

The air system will include a Bendix AD-9 air dryer with integral 12-volt heated moisture ejector. The air dryer will have a desiccant cartridge and incorporate an integral turbo cutoff valve. The turbo cutoff allows the air dryer to purge water and contaminants without any loss of turbo boost or engine horsepower.

AUXILIARY AIR OUTLET

There will be one-(1) air outlet installed inside the driver's doorstep area plumbed to the vehicle's air system. The outlet will incorporate a pressure protection valve to prevent interference with the vehicles air brake system.

Will be plumbed to officer's side pump panel from the 1700 cu in accessory tank.

ENGINE

The chassis engine shall be a Cummins heavy duty (HHD) certified X15 engine. The X15 engine shall be an in-line six-(6) cylinder, four-cycle diesel-powered engine. The engine shall offer a rating of 565 horsepower at 1800 RPM and shall be governed at 1900 RPM. The torque rating shall feature 1850-foot pounds of torque at 1000 RPM with 912 cubic inches (14.9 liter) of displacement.

The engine shall feature a VGT™ Turbocharger, a high-pressure common rail fuel system, fully integrated electronic controls with an electronic governor, and shall be EPA certified to meet the 2027 emissions standards.

A wiring harness shall be supplied ending at the back of the cab. The harness shall include a connector which shall allow an optional harness for the pump panel. The included circuits shall be provided for a tachometer, oil pressure, engine temperature, hand throttle, high idle and a PSG system. A circuit for J1939 data link shall also be provided at the back of the cab.

COMPRESSOR

Air compressor will be a Wabco brand, minimum of 37.4 cubic feet per minute capacity. Air brake system will be the quick build up type. The air compressor discharge line will be stainless steel braid reinforced Teflon hose.

A pressure protection valve will 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 will meet NFPA 1900 latest edition for rapid air pressure build-up within sixty-(60) seconds from a completely discharged air system. This system will 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.

TRANSMISSION

The chassis will be equipped with an Allison 4000 EVS automatic transmission. It will be equipped with 4th gear operating controls and programmed for Fire Apparatus vocation. An electronic oil level indicator will be provided as well as a diagnostic reader port connection. The transmission will be geared to provide one-to-one ratio in fourth gear for fire pump applications. This dedicated "lockup" circuit is provided for pump operation. The transmission fifth gear will be an overdrive ratio, permitting the vehicle to reach its top speed at the governed engine speed.

The transmission will be equipped with an automatic neutral feature. Applying the parking brake will command the transmission to neutral, regardless of drive range requested on the shift selector which will require re-selecting the drive range to shift out of neutral.

The transmission will be equipped with dual PTO ports with engine speed capabilities. The transmission will be cooled by the radiator-mounted heat exchanger. The transmission fluid will meet Allison specification TES-295.

TRANSMISSION MODE PROGRAMMING

The transmission, upon start-up, will select the fifth speed operation without the need to press the mode button.

DRIVELINES

The chassis will be equipped with Neapco 1810 series drive shaft with full round yokes and universal joints. The drive shaft tubing will be a minimum of 4.50" diameter with .134" wall thickness. The drive lines will be balanced at a minimum of 3000 RPM.

DRIVELINE GUARDS

All drive shafts shall have suitable guards, multiple if necessary, with catch brackets to prevent damage in case of failure of shaft or universal joint. Special attention shall be given to areas where fuel/hydraulic lines/tanks are located.

FIRE PUMP MOUNTING

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

ENGINE COMPRESSION BRAKE

A compression brake, for the six-(6) cylinder engine will be provided. A cutout relay will be installed to disable the compression brake when in pump mode or when an ABS event occurs. The engine compression brake will activate upon 0% accelerator when in operation mode and actuate the vehicle's brake lights.

The engine will utilize a variable geometry turbo (VGT) as an integrated auxiliary engine brake to offer a variable rate of exhaust flow, which when activated in conjunction with the compression brake shall enhance the engine's compression braking capabilities.

An engine compression brake control device shall be included. The electronic control device shall monitor various conditions and shall activate the engine brake only if all of the following conditions are simultaneously detected:

- A valid gear ratio is detected.
- The driver has requested or enabled engine compression brake operation.
- The throttle is at a minimum engine speed position.
- The electronic controller is not presently attempting to execute an electronically controlled final drive gear shift.

The compression brake shall be controlled through an on/off switch and a low/medium/high selector switch.

ENGINE COOLING SYSTEM

The engine cooling system will have the capacity to cool the engine according to the engine manufacture's requirements.

RADIATOR

The engine radiator will be of a bolted design and have a minimum core area of 1570 square inches. The top and bottom tanks will be stamped 11-gauge steel. The tanks will be attached to the header assemblies with a minimum of fifty-(50), 5/16" bolts. The spacing between fasteners will not exceed 2.00 inches in order to minimize the possibility of leaks.

The header plates will be made of 16-gauge brass while the tubes will be .0068-inch-thick brass and .076 by .625 inches in size. The tubes will have a smooth bore with welded seems which allows for cleaning of the radiator.

The radiator will contain three rows of tubes with a minimum of 98 tubes per row for a total of not less than 294 tubes. The tubes will be arranged in an inline profile across the core. Louvered serpentine fins constructed of copper with a density not greater than 16 fins per inch will be used in the construction of the radiator.

The radiator tubes will be attached to the header plates with a Beta-Weld dual bonding process. The coolant side connection will be welded, while the airside will be soldered.

The top tank will include an integral deaeration tank, which removes air from the engine water. The top tank will include a sight glass for coolant level inspection without removing the radiator cap. A low coolant warning will be incorporated to alert the driver.

The bottom tank of the radiator will incorporate oil to water plate-type cooler for the transmission. The cooler is designed to cause a turbulent flow of the transmission oil through the core to force heat transfer. The cooler will be sufficient to cool an Allison Transmission without output retarders.

To minimize stress from road and engine vibrations on the radiator, a shock mount will be used. This mounting system will consist of .375" outside diameter long threaded rods, washers and bolts plus heavy rubber shock absorbers.

A high efficiency fan will be surrounded by a formed welded fan shroud. The sweep of the fan will not exceed the width of the radiator core. Fan diameters that exceed the width of the radiator core will not be acceptable.

CHARGE AIR COOLER

The charge air cooler will be constructed of aluminum with cast, aluminum side tanks. The cooler will have a frontal core area of not less than 1033 square inches.

The exterior fins will be louvered serpentine design constructed of .006-inch-thick aluminum and have a density no greater than seven-(7) fins per inch. The internal fins will be designed to create air turbulence in order to increase heat transfer efficiency.

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

The piping between the charge air cooler and engine will use four-(4) ply silicone woven Nomex hoses with stainless steel bands. The bands are used to maintain the shape of the hose during changing turbo boost pressures. The hoses will be attached with stainless steel constant tension hose clamps.

SKID PLATE, RADIATOR

The radiator installation will include a heavy-duty radiator skid plate to protect the radiator from debris or obstructions under the chassis. The skid plate will be designed so the angle of approach is not affected.

The skid plate will be integral with the chassis frame and constructed from 3/8" thick steel plate.

COOLING SYSTEM FAN

The engine cooling system will incorporate a thermostatically controlled fan clutch. When the fan clutch is disengaged, the vehicle will have improved vehicle performance, cab heating in cold climates, and fuel

economy, while eliminating the potential dangers associated with a fan going from non-rotating to rotating as found with other style fan clutches.

The fan will automatically lock-up when the vehicle is placed in pumping mode.

A shroud and recirculation shields system will be used to ensure that once air has passed through the radiator, the same air is not drawn through again.

RADIATOR COOLANT. LONG LIFE

The coolant system will contain a mixture to keep the coolant from freezing to a temperature of -34 degrees F.

The coolant supplied will be Long Life Coolant compatible with the engine manufacturer's requirement.

COOLANT HOSES

The chassis will be equipped with silicone hoses for the radiator and heater circuits.

COOLANT HOSE CLAMPS

Stainless Steel constant tension hose clamps will be provided for all coolant and heater hoses of 1/4" diameter and greater.

AUXILIARY ENGINE COOLER

The cooling system will have a tube and bundle engine cooler mounted in the upper radiator water pipe. Water from the fire pump will be circulated through 1/2" tubing to the cooler. A valve located on the pump panel will control the cooling circuit.

ENGINE BLOCK HEATER

A Phillips 1500-watt 120-volt AC engine coolant heater will be installed into the engine cylinder block. The coolant heater plug will be located in the driver's step well. An interior access panel will be provided for service of the block heater.

WIRING. BLOCK HEATER

The engine block heater will be wired to a separate Auto Eject specific to the block heater. The Auto Eject cover will be provided with a KUSSMAUL label, 091-55NP-04, marked "BLOCK HEATER - 120 VOLT A.C. INPUT".

20 AMP SUPER AUTO-EJECT. BLOCK HEATER

A Kussmaul Super Auto Eject, model 091-159-20-120, with weatherproof cover will be provided wired to the engine block heater. The Super Auto Eject is to be completely sealed to prevent internal contamination of the working components.

The internal switch arrangement of the Super Auto Eject will be designed to close and open the 120V AC circuit after the mating connector is inserted and before the connector is removed. This design will

prevent arcing at the connector contacts. The electrical connection will be provided as a 120V 20-amp type using a NEMA 5-20 connector.

The UL maximum allowable amperage draw on receptacles is generally 80% of their listed rating, for example, the 30 AMP auto-eject should not carry more than 20-amp continuous load. When adding the different amperage draws of the components being installed on the chassis, be sure to factor in whether the components will draw a continuous load or an intermittent load.

Amp Draw Reference List

- Kussmaul 1000 Charger: 3.5 Amps
- Kussmaul 1200 Charger: 10 Amps
- Kussmaul 35/10 Charger: 10 Amps
- 1000W Engine Heater: 8.33 Amps
- 1500 Engine Heater: 12.5 Amps
- 120 V Air Compressor: 4.2 Amps

The Auto Eject cover will be a Kussmaul 091-55GY, gray in color.

Receptacles will be placed behind driver's door on exterior of body: gray block heater receptacle top, battery indicator gauge middle, red battery charge receptacle bottom, red body receptacle to the rear.

SHORE POWER INLET PLATE

A shore-power "Inlet Plate" will be permanently affixed at or near the power inlet.

The plate will indicate the following:

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

FUEL TANK

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

The tank will be certified to meet FMCSR 393.65 and 393.67.

The fuel tank shall not be painted or sprayed. The tank will be left natural clean stainless-steel finish only.

FUELLINES

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

VALVES, FUEL SHUTOFF

There will be two-(2) fuel shutoff valves which will be installed, one-(1) in the fuel draw line at the primary fuel filter and one-(1) in the fuel outlet line at the primary fuel filter to allow the fuel filters to be changed without loss of fuel to the fuel pump.

A third fuel shutoff valve will be installed in the fuel draw line, near the fuel tank to allow maintenance to be performed with minimal loss of fuel.

FUEL/WATER SEPARATOR, PRIMARY FILTER

The Cummins X engine will be supplied with a Racor model 3150R primary fuel water separator with a bottom drain valve mounted in the chassis frame. The LMC will display "WATER IN FUEL" and an alarm will sound when the water needs to be drained from the fuel water separator.

FUEL FILTER, SECONDARY

The Cummins engine will be supplied with a secondary fuel filter mounted to the engine.

EXHAUST SYSTEM

The apparatus will contain a single module device that houses a particulate filter and SCR (Selective Catalytic Reduction) downstream of the engine's turbo. This single module device is required to maintain US 2022 Emissions Certification. This filter and SCR device replaces the conventional style filter. The location has been engineered, tested, and set to allow for proper regeneration. Therefore, this filter cannot be removed, altered, or relocated.

A LMC (Lightbar Message Center) will include lights for this system and will be located in the cab informing the driver of the systems status. At times a forced regeneration may be required, which would be indicated by a combination of illuminating and/or flashing lights depending on the engine model.

A dual momentary switch labeled "REG. INHIBIT / NORMAL / REG. FORCED" will be located within reach of the driver's seated position. The momentary REG. FORCED position initiates the forced regeneration if a regeneration is required. The momentary REG. INHIBIT position prevents the vehicle from having the ability to regenerate. Once the inhibit feature has been activated the ignition switch must be cycled off/on to return the vehicle to normal regen. All vehicles equipped with pumping applications will allow for passive regeneration whenever the system requires and the engine is at its proper parameters unless inhibited by the DPF inhibit switch. In no way will this feature affect the RPM of the engine being controlled by the pump operator.

The engine exhaust system will be horizontal in design using stainless steel tubing mounted under the frame rail right side extending forward of the rear wheels.

An exhaust temperature mitigation device will be installed. The temperature mitigation device will lower the temperature of the exhaust by combining ambient air with the exhaust gasses at the exhaust outlet.

HEAT SHIELDS EXHAUST SYSTEM

Heat shields will be provided as needed to prevent damage to body and wiring from excessive exhaust temperatures. The exhaust pipe will be wrapped in multi-layered insulation blankets, from just aft of the

turbo down to inlet side of the DPF. Each blanket will have a fiberglass inner layer and a silicone impregnated fiberglass cloth outer layer.

All harnesses and cables, in proximity to exhaust system components, will be protected with insulation.

DPE REGENERATION PROCESS

NFPA 12.2.6.7.1 the regeneration process will be activated by two methods:

1) Automatically by the engine system but only when the transmission is in gear and the speedometer indicates a speed above 5 mph (8km/hr.) whether the apparatus is in motion or is operating in stationary pump mode with an engine rpm sufficient to register 5 mph (8 km/hr.) on the speedometer.

2) Manually when initiated by activation of a switch located in the driver's area of the driving compartment.

There will also be an inhibit switch placed near the driver to inhibit an automatic Regen.

The LMC will include the following three lights. HIGH EXHAUST TEMP, REGEN INHIBIT and DIESEL PART FILTER.

The dual momentary switch labeled "REG. INHIBIT / NORMAL / REG. FORCED" will be installed to the right of the steering column, momentary up will be Regen Inhibit, middle will be Normal, and momentary down will be Reg. Forced. The LMC will light up indicating the regeneration is inhibited whenever the Inhibit has been selected.

TAIL PIPE ADAPTER

The exhaust system shall include a complete Nederman system which shall include the transmitter, wired to the ignition switch, receiver magnet installed on the body and exhaust pipe ring / modifications.

HEATING/AIR CONDITIONING SYSTEM

The climate control system will use three-(3) heater-air conditioner units.

The front circuits will use two-(2) heater-air conditioning units, mounted under the dash on the driver's side and under the officer's side. These units are each rated at 14,700 BTU heating and 19,200 BTU cooling. The units will blow up toward the windshield through four-(4) fixed vents in the dash. Additionally, there will be two-(2) adjustable vents each side to direct air at the lower portion of the driver and officer seating areas. Two-(2) switches, including low/med/high and heat/off/ ac, will control the front system.

A DEFROST / DEFOG switch will be installed to operate both the front heating, systems in the DEFROST selection to provide pure heat for defrosting. In the DEFOG selection the front heating, and cooling systems are activated. This provides hot and dry air for defogging purposes. In either position the hot and dry air will vent through the fixed vents in the dash.

The two-(2) front systems will combine to put out a total of 688 CFM air flow.

The rear circuit will use one large heater-air conditioner unit with a rating of 34,150 BTU cooling and 36,000 BTU heating. It will be mounted under the forward-facing rear seats. Ducting will run up the rear wall to adjustable vents (minimum of six) running along the center of the ceiling toward the front of the cab. Two-(2) switches including high/med/low and heat/off/AC will control the unit. In addition to the rear control switches, there will be an ON/OFF switch located near the driver to disable the rear unit if needed.

The rear system will put out a total of 640 CFM air flow.

The total system will have a capacity of 72,550 BTU cooling, 65,400 BTU heating and a total in-cab air flow of 1,328 CFM.

The entire roof and back wall will be heavily insulated with 1" foam to enhance the cooling system.

All three-(3) heaters will be plumbed with a shut off valve at the engine.

The air conditioning system will be powered through one-(1) engine driven 19.1 cubic inch compressor.

Two-(2) roof top condensers, each rated at 38,700 BTU, will be provided.

Controls for the rear heat and A/C shall be installed on the rear wall ductwork.

The two-(2) roof top condenser housings will be black in color.

ALTERNATOR

The alternator will be a Delco Remy model 55SI 430 amp. The alternator will be engine driven via a poly-groove power belt with an automatic tensioner. The alternator will be a brush less design. The alternator will meet all current applicable NFPA 1900 Edition requirements for performance.

BATTERY SYSTEM

The battery system will be a single system consisting of six-(6) Group 31, 12-volt DC, heavy-duty, high cycle automotive batteries. The battery bank will have a group rating of 4500 cold cranking amperes (CCA) and a reserve of 1080 minutes at zero degrees Fahrenheit.

All battery wiring will be welded battery cable capable of handling 125% of the actual load. It will be run through a heat-resistant flexible nylon "HTZL" loom rated at a minimum of 300 degrees Fahrenheit. All cable connections will be machine crimped and soldered.

BATTERY BOXES

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

Battery boxes shall include black modular flooring.

SWITCH, MASTER BATTERY DISCONNECT

The chassis batteries will 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 will be located within easy access of the driver upon entering or exiting the cab. All electrical circuits will be disconnected when the switch is in the "OFF" position.

BATTERY CHARGER

A Kussmaul Auto Charge 1200, model 091-187-12-REMOTE battery charge and saver will be supplied and installed in the apparatus to maintain the chassis electrical system.

AIR COMPRESSOR, 120-VOLT

A Kussmaul Auto Pump model 091-9B-4AD compressor will be installed on the apparatus. The Auto Pump AC is a 120-volt 60 Hz shaded pole A.C. motor operating a single cylinder air compressor designed specifically for installation on vehicles with air brakes. During long idle periods of the vehicle, when even the slightest seepage can cause an air brake system pressure to drop below the brake lockup pressure, the Auto Pump AC automatically starts to maintain the pressure.

The Auto Pump AC motor is directly coupled to the compressor section eliminating all belts and pulleys and assuring long life and reliable operation. A heavy-duty pressure switch is adjusted to start the compressor when the system pressure drops below 75 PSI and stops the compressor when 95 PSI is attained. The start up pressure is field adjustable - the pressure differential between start up and stopping is fixed. The moisture trap provided permits routine draining of accumulated moisture in the Auto Pump output line.

The air compressor will have the following ratings:

Input: 120-Volt AC, 50/60 Hz, 1.8 AMPS
Output: 1.0/1.3 CFM, Open Flow, 100 PSI MAX
Motor Type: Shaded Pole AC
Pressure Switch: Adjustable Set Point (Factory Set 75 PSI Cut-in/95 PSI Cut-out)

Fitted with the auto-condensate drain option. The drain tube shall be routed below and to the exterior of the apparatus.

SUPER AUTO-EJECT(S), 20 AMP

Two-(2) Kussmaul Super Auto-Eject type receptacle(s) model 091-55-20-120, 20-amp 120-volt shore power assembly will be installed. A solenoid wired to the vehicle starter is energized when the engine is started. This instantaneously drives the plug from the receptacle. The receptacle will be provided with a weatherproof cover. The cover will be spring loaded to close, preventing water from entering when the shoreline is not connected. The super auto eject receptacle will be mounted in a location specified by the department and is designed to accept a 120V AC from a shoreline plug.

The UL maximum allowable amperage draw on receptacles is generally 80% of their listed rating, for example, the 20-amp receptacle should not carry more than 16-amp continuous load. When adding the different amperage draws of the components being installed on the chassis, be sure to figure in whether the components will draw a continuous load or intermittent load.

One (1) auto eject is for apparatus batteries. One (1) auto eject is for all other shore power supplies.

The receptacle will be located in the driver's side cab wheel well area.

The Auto Eject cover(s) will be a Kussmaul 091-55-234-XX.

The cover will include a built in easy to see bar graph indicator display for charging status.

Order of receptacles behind driver's door: gray block heater receptacle top, battery indicator gauge middle, red battery charge receptacle bottom, red body electric receptacle to the rear

DISPLAY BAR GRAPH

The charger will include a model 091-199-001 remote bar graph display.

The remote bar graph display will be located on the driver's seat rider next to the master battery switch.

SHORE POWER INLET PLATE

A shore-power "Inlet Plate" will be permanently affixed at or near the power inlet.

The plate will indicate the following:

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

CUSTOM CAB

The cab will be custom, fully enclosed, engine forward full tilt cab. The cab will be an "Open Interior" roll cage design requiring no inner walls or vertical interior supports.

All storage areas inside the cab will fully comply with NFPA 1900 restraint requirements of 9G's.

Crash Test

The cab will exceed the strict and detailed requirements of the Economic Commission for Europe Structural Standard, ECE-29R. The test will consist of an impact load test and a vertical load test to the cab.

The cab will have a frontal impact test via pendulum, with an impact load in excess of 127% of the ECE-29R Standard. The estimated speed of the 3736-lb (1698-kg) pendulum will be a minimum of 18.2 mph. The cab doors will be closed during the impact test but be able to open after impact. There will be no passenger intrusions or any structural component failures. The cab will meet or exceed all criteria of this portion of the test.

In conjunction with the frontal impact test, a vertical load test will be implemented to the cab. The cab roof will be loaded with a minimum of 65,979 lbs. (29.53 metric tons). There will be no failure to the cab structure or mountings, any passenger compartment intrusion or degradation of occupant survival space, or any other structural failure. The cab will meet or exceed all criteria of this portion of the test.

A complete photographic, video, data, and dimensional record of these tests will be available and placed on record for customer evaluations.

Cab Material

The cab will be constructed entirely of aluminum alloy extrusions and 3/16" (.188) thick, 5052-H32 alloy, marine grade aluminum sheets. The corner posts, door slam posts, roof rails and doorframes will be made of custom extrusions designed specifically for this cab with slots for inserting the skin. The rear wall and roof will be reinforced with a grid of rectangular extrusions, which are welded to the overall cab extrusion framework.

The front corner caps will consist of castings designed specifically for this cab with relief areas cast in place for attachment of roof skin and intersecting structural extrusions. Overlapping formed corner caps are not acceptable.

Cab Face, Double Wall

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

Cab Floor

Cab floors will be constructed from an aluminum extruded frame and 3/16" thick aluminum plate. Floor mats and insulation are detailed later in this specification.

The forward cab floor will be as large as possible for both the driver and officer. Floorboards will extend in width from the side of the engine tunnel, all the way to the cab door inner panel. They will extend forward from the seat riser to the inner portion of the double wall cab face. The officer will have approximately 28" of foot room.

The entire rear floor of the cab, to reduce trip and fall hazards, will be a single plane. In applications requiring the use of a top-mounted PTO, a raised area in the floor may be required.

For maximum crew comfort and eliminate leg fatigue during emergency responses, the floor beneath the rear facing jump seats will be large enough for a seated firefighter to rest both feet side-by-side. Cab floor designs that are wide enough for only one foot will not be accepted.

Cab Corrosion Protection

A corrosion preventative material will be applied during cab construction. A ten-(10) year warranty against corrosion perforation will be provided for the cab.

Wheel Well Liners

Full wheel well liners will be installed beneath the cab to protect the bottom of the cab from road splash. The liners will be constructed of aluminum and be full width.

The wheel well liners will be attached with threaded fasteners and be easily removable for service.

Windshield Wipers, Intermittent

Two-(2) electric "Pantograph" style windshield wipers will be installed on the front face of the cab. The motors will operate through a 72-degree sweep and include 24-inch blades to give superior wiper coverage. A washer reservoir of not less than 70 ounces will be mounted a latched door recessed in the officer's step.

A switch located on the turn signal control arm will operate the intermittent wipers.

Cab Interior, Extreme Duty

Cab floors will be covered with a pebble grain rubber matting with barrier type insulation. Edges of the insulation will be trimmed with a cast aluminum foot plate for a pleasing appearance.

An insulated covering will be fitted over the engine tunnel. Made from the same material as the cab floor insulation, this covering will insulate the cab from engine heat and noise. A Cast Products aluminum door on the engine tunnel will provide access for fluid checks.

The back side of the engine cover, as well as a 2" to 3" return on the top side, will be covered with a sprayed aluminum panel and be of sufficient strength to allow for 9G resistant mounting of any optional hand lights, entry tools, or other fire rescue equipment specified by the customer.

The cab will have a custom built, smooth aluminum plate dashboard, overhead console, glove box, instrumentation panel and switch panel. The front overhead will include room for the three sun visors and the door open indicator light.

The front door posts will be trimmed with styled aluminum covers that conceal any wiring, as well as including a mounting area for rubberized grab handles. The center windshield post will be covered F-Shield paint finish.

Prior to installing the headliner and rear wall padding, minimum R-7 insulation, will be installed between the interlocking extrusions.

These covers serve to finish the interior, cover wiring harnesses and insulate the interior from sound and heat.

Cab Steps

All cab steps will be of a stationary, fixed design that use no moving parts and requires no periodic maintenance other than cleaning.

There will be an open-grip, bright finish step at each cab door opening. The area under the step will be enclosed to prevent road dirt from entering the cab. There will be provisions made at the front of the step for easily flushing out any dirt accumulation.

At each door, opening there will also be an intermediate cab step. Intermediate steps will be full width of the doorstep area and overlaid with embossed aluminum tread plate.

Cab Step Heights

The distance from level ground to the first cab step will be 19-21 inches without using swing-down style or under-cab stirrup auxiliary steps.

The distance from first cab step to intermediate step will be approximately 12-1/2 inches front and rear.

The distance from intermediate step to cab floor will be approximately 9-1/2 inches in the front and 12 inches in the rear.

HINGES, CAB DOOR

Each cab door will be attached to the cab with two-(2) concealed automotive style hinges with restraining strap.

Doors must be able to be opened a full 90 degrees. Piano hinges preferred if available.

CAB DOOR LOCKS

There will be individual manual twist type door locks at each door interior handle. In accordance with FMVSS 206 all exterior door locks will be keyed alike.

CAB DOOR WINDOWS, ELECTRIC

All cab door windows will be electrically operated. The driver will have four-(4) switches located overhead to control the operation of each door. All remaining doors will contain one-(1) heavy-duty switch to control the window operation located on top of the door panel.

NOTE: On the E2020 electrical system the power windows can't be wired to direct battery power.

CAB TILT LOCK

The cab will be supported at four points. At the front, there will be two center bonded bushings. At the rear, there will be two hydraulic locking latches.

The cab will tilt 45 degrees by means of a pair of hydraulic cylinders driven by the electric pump. The tilt system geometry will be designed in such a way that the maximum hydraulic pressure in the system does not exceed one-half the pressure rating of the cylinders or pump when the cab is empty. This allows the Fire Department to leave some equipment in the cab when maintenance is required (although this equipment must be secured).

Once the cab is fully tilted, a safety latch will automatically engage and act as a positive lock. The lock is released by a pull cable. The hydraulic cylinders will be equipped with velocity fuses to prevent the cab from falling, should the hydraulic system fail.

The front of the cab pivots and rides on the center bonded bushings by means of lubricated pivot pins that retain the cab yoke in the bushings. The bushings allow limited movement of the cab, and isolate the cab from noise and vibration.

The rear mounts consist of a pair of hydraulic cab latches mounted on rubber cushioned mounting brackets. Latches release when the pressure in the tilt system exceeds 500 PSI.

An ignition interlock system will be installed for cab tilt operation. Cab tilt operation requires the master battery switch to be in the on position with the parking brake applied.

CAB TILT PUMP W/MANUAL BACKUP

An electric over hydraulic cab lifting pump will be provided to tilt the cab for engine and transmission service. The pump will be operated by a remotely wired control box with coiled cord, weather resistant plug, and receptacle. An interlock will be provided preventing the cab from inadvertently rising until the transmission is placed in the neutral position and the parking brake is set.

In the event of electrical failure, a hydraulic manual backup will be provided to tilt the cab.

The entire cab will be capable of tilting approximately 45-degrees to allow for easy maintenance of the engine and transmission.

Cab Style

The cab will be a LFD+ (long four door plus) with seating up to eight-(8) seating positions.

Cab Dimensions

The exterior width of the cab will be 100" wide (skin to skin) and 120" wide with standard mirrors. The overall cab length will be 148" with a dimension of 74" from the centerline of the front of the axle to the back of the cab.

Windshield

The standard windshield will have approximately 4200 square inches of unobstructed viewing area. It will be a two-(2) piece design with tinted automotive safety glass, with a wraparound design. A .030-inch-thick vinyl layer will separate the laminated glass.

All other cab glass will be tinted and tempered.

UREA STORAGE TANK

There will be a 5-gallon urea tank located in the left side of the pump house. There will be access for filling this tank. There will be a urea level gage located in the cabs main instrument panel.

SEALED ENGINE TUNNEL

The engine tunnel will be a structural part of the passenger cab, constructed from welded 3/16" aluminum plate and reinforced with aluminum extrusions. The rear of the engine tunnel will be no less than 69" inches from the rear wall of the cab, allowing maximum legroom for forward facing passenger. After welding, the seams will be completely sealed with silicone caulking.

Engine enclosures that are not an integral part of the cab structure are not acceptable.

The interior of the engine tunnel will be insulated with 1" thick foil backed insulating foam, attached with stud and button method. A cross-section analysis of the insulation will reveal a 1/8" thick barrier material for additional noise and heat insulation.

A Cast Products aluminum door on the engine tunnel will provide access for fluid checks.

COMPARTMENT, LEFT SIDE EXTERIOR ROOF HOOK

There will be a recessed open-style compartment provided for the exterior storage of all-purpose hooks behind the left side rear crew entry doors. The compartment will be large enough to hold two-(2) Fire Hooks Unlimited RH-6, 6' FDNY roof hooks side by side in a vertical position. A drop in well with drain holes will be provided at the bottom of the compartment for additional security. One-(1) small 12-volt LED light will be mounted in the top of the compartment operated by the chassis headlamp switch.

COMPARTMENT, LEFT SIDE HALLIGAN STORAGE

There shall be an open storage area for two-(2) Fire Hooks Unlimited Pro-Bar 30's (Halligans) side-by-side on the left side of the cab. The compartment shall be approximately 12" wide x 36" high x 8" deep. No door shall be installed on the compartment. A 6" high lip shall be provided at the bottom of the compartment for additional security. Drain holes shall be installed on the floor.

The inside of the compartment shall be lined with treadplate. The opening shall be trimmed with brushed stainless-steel angle.

COMPARTMENT, RIGHT SIDE WATER CAN STORAGE

There shall be a storage compartment for one-(1) 2-1/2-gallon water extinguisher with carrying strap on the right-side of the cab. The compartment floor shall be angled down. No door shall be installed in the compartment. The floor and sides of the compartment shall be lined with a polypropylene sheet and the back wall shall be lined with rubber matting to provide scuff protection. The bottom of the compartment shall be supported to eliminate breakage. The compartment shall be vented to facilitate moisture drainage.

The inside of the compartment shall be un-painted, smooth aluminum. The opening shall be trimmed with brushed stainless-steel

COMPARTMENT, RIGHT-SIDE EXTERIOR ROOF HOOK

One-(1) recessed open-style compartment shall be provided for the exterior storage of all-purpose hooks behind the rear crew entry doors right-side. The compartment shall be large enough to hold two (2) Fire Hooks Unlimited RH-6, 6' FDNY Roof Hooks side by side in a vertical position. A drop in well with drain holes shall be provided at the bottom of the compartment for additional security. One (1) small 12-volt LED light shall be mounted in the top of the compartment operated by the chassis headlamp switch.

SEAT MATERIAL

The seats will be covered with Bostrom Low Seam Durawear Plus material.

SEAT COLOR

The cab seats will be black in color.

SEAT LOGO

The Fire Department patch/logo will be embroidered in the head rest of the seats.

SEAT BELTS

The seats will be equipped with a standard 3-point seat belt with single automatic retractor.

SEAT BELT EXTENDER(S)

There will be six (6) IMMI Ready Reach seat belt extenders installed on the specified cab seats. Ready Reach is an enhanced seat belt system that places the buckle and D-loop in an optimal location.

Installed on all six (6) crew cab seats.

BRACKETS, SCBA SEATS

There will be one-(1) IMMI Smartdock SCBA Locking System provided with each SCBA seat. The Gen 2 hands-free self-contained breathing apparatus (SCBA) holder. The hands-free holder will meet NFPA 1900-03 9G dynamic requirements for cylinder restraint systems for use in crew compartments of emergency response vehicles. The bracket will accommodate and secure most types of self-contained breathing apparatus cylinders.

The holders will retain the backpack, harness and bottle when subjected to an SAE J2418 dynamic crash pulse (SAE J2418 deals with seatbelt restraints in a front collision). The holder must hold through multiple directions – at least 180° horizontally and also a smaller pulse vertically.

The release mechanism must be accessible when seated.

The holders must still release after the pulse at no more than 125% of the original release force.

The holders must be labelled that it complies with this section.

NO FILLER PANELS REQUIRED

No SCBA seat filler panels will be provided with the apparatus.

DRIVER'S SEAT

Driver seat shall be a Bostrom Sierra Defender A350, air suspension seat.

OFFICER'S SEAT

The officer's seat will be a H. O. Bostrom Tanker 450 SCBA seat.

The seat will have a tapered and padded seat cushion with a fixed seat back. The seat will include bolster support and tapered side cushions with built in SCBA strap storage hooks. The seat will include a SCBA storage area with integral, contoured headrest.

Officers seat to be as far back as possible in passenger area, seat to have 90-degree seat back. Before final mounting of seat Committee rep will be shown location.

COMPARTMENT, OFFICER'S SEATBASE

There will be a compartment provided under the officer's seat for additional storage. The compartment will have a hinge door with latching mechanism.

CREW SEAT, DRIVER'S SIDE REAR FACING

The outboard rear facing seat installed behind the driver will be a H. O. Bostrom Tanker 400CT SCBA seat with flip bottom.

The seat will have a tapered and padded seat cushion. The seat will include bolster support and tapered side cushions with built in SCBA strap storage hooks. The seat will include a SCBA storage area with integral, contoured headrest.

Seat to have 90-degree seat back.

CREW SEAT, OFFICER'S SIDE REAR FACING

The outboard rear facing seat installed behind the officer will be a H. O. Bostrom Sierra 400CT SCBA seat with flip bottom.

The seat will have a tapered and padded seat cushion. The seat will include bolster support and tapered side cushions with built in SCBA strap storage hooks. The seat will include a SCBA storage area with integral, contoured headrest.

Seat to have 90-degree seat back.

CREW SEATS, INBOARD FORWARD FACING

The two-(2) inboard forward facing seats installed against the rear cab wall will be a H. O. Bostrom Tanker 400CT SCBA seat with flip bottom.

The seats will have a tapered and padded seat cushion. The seat will include bolster support and tapered side cushions with built in SCBA strap storage hooks. The seat will include a SCBA storage area with integral, contoured headrest.

The forward-facing center seating positions will include an enclosed style seat riser located and installed at the rear wall. The seat frame will be constructed of Marine Grade aluminum plate and will be sprayed with F-Shield to match the cab interior.

The seats will be equipped with the Bostrom Fold & Hold option.

Seat to have 90-degree seat back.

CREW SEATS, OUTBOARD FORWARD FACING

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The forward-facing seating positions will include an enclosed style seat riser located and installed at the rear wall. The seat frame will be constructed of Marine Grade aluminum plate and will be sprayed with F-Shield to match the cab interior.

The seats will be equipped with the Bostrom Fold & Hold option.

Seat to have 90-degree seat back.

A door shall be installed on each forward-facing seat riser base. Door to be vented and have a lift and turn style latch. Install a light inside each forward-facing seat riser. The light shall be activated by opening the door.

CAB ROOF

The cab roof will be raised 8" providing additional headroom above the crew area. The raised portion will start midway over the driver and officer seats.

The cab will offer an interior height of 60" from the front floor to the headliner in the non-raised roof area and a rear floor to headliner height of 66" in the raised roof area.

CAB DOORS

All cab doors will be full length, designed to cover the step well area. Each cab door will be flush type with a minimum opening of 90 degrees.

The front doors will be approximately 40" inches wide by 78-1/2" inches tall. The doors will have a two-piece window, one operational and one fixed. The combined viewing area will be no less than 796 square inches. For added safety, the front door windows will slant down for maximum visibility.

The rear doors will be approximately 34" inches wide by 86-1/2" inches tall. The doors will have a two-piece window, one operational and one fixed. There will also be an additional fixed window in the upper portion of the door. The operational window will be capable of rolling down completely for a combined viewing area for all three-(3) windows of no less than 712 square inches. The crew area windows will have a dark tint.

The doors will include a bulb style rubber seal around the perimeter of each door frame ensuring a weather tight fit.

The cab entry doors will be equipped with exterior paddle handles, suitable for use while wearing firefighter gloves. The handles will be made of aluminum with a chrome plated finish. The interior latch will be cast aluminum, oversized for easy access with a gloved hand.

Cab doors shall open a full 90 degrees to side of body.

UPPER DOOR PANELS, INTERIOR

There will be four-(4) interior upper front and rear door panels installed covered with “F-Shield” extending from the window down to the lower kick plate. The color of the panels will match the interior of the cab.

LOWER DOOR PANELS, INTERIOR

There will be four-(4) interior lower front and rear door panels installed covered with “F-Shield” extending from bottom of the upper panel to the bottom of the door. The color of the panels will match the interior of the cab.

SLIDING CAB WINDOW, LEFT SIDE

A vertical sliding window will be installed in the left sidewall of the cab between the front and rear door. The window area will be approximately 16-1/2" wide by 33-1/2" high. The glass will be tempered, dark tinted and retained with one-piece triple locking rubber lacing.

SLIDING CAB WINDOW, RIGHT SIDE

A vertical sliding window will be installed in the right sidewall of the cab between the front and rear door. The window area will be approximately 16-1/2" wide by 33-1/2" high. The glass will be tempered, dark tinted and retained with one-piece triple locking rubber lacing.

FRONT GRILLE, CAST ALUMINUM

The front grille will be a cast aluminum assembly with 470 square inches of open area on 100" wide cabs and 430 square inches of open area on 96" wide cabs. The grille will be backed with an aluminum honeycomb mesh to protect the radiator.

FRONT GRILLE LOGO

The front grille will have a custom logo that reads “436” with backlit red LED lights that area activated by the battery on/off switch.

INTAKE GRILLE, RIGHT SIDE W/EMBER SEPARATOR

A right stainless-steel grille will be installed approximately 70" above ground level on the right side of the cab between the front and rear cab doors. The grille will have a minimum open area of not less than 119 square inches serving as an air intake and warm air dispersant system.

An Ember Separator will be installed between the stainless-steel grill and the air filter system allowing fresh air to pass through to the engine while preventing particles of .039 inches (1.0 mm) or larger from entering the system in accordance with the latest version of NFPA easily accessible through the exterior stainless-steel grille.

The grille will be notched to allow easy access without removing the cab handrail.

HEATED/REMOTE CAB MIRRORS

Two side-mounted Velvac model 713760 rear view mirrors will be installed with an 8" X 16" mirror head and a separate 6" x 6-1/2" parabolic mirror. The mirror head will be heated and remotely adjustable by the driver. The mirrors will be aerodynamically designed to reduce wind buffeting and resultant vibration. The housings will be polished stainless steel.

The mirrors support tubes will be stainless steel, with breakaway mounting brackets.

MIRROR, EYEBALL

A Rosco 801DSSP, 8" diameter stainless steel convex mirror will be installed. The mirror will be mounted on the right front of the cab above the windshield on a stainless-steel mounting bracket, suitable for viewing front of apparatus from cab interior.

The mirror will be designed and installed in a manner that prevents vibration.

MIRROR, ADDITIONAL CONVEX

One-(1) 6" diameter stainless steel convex mirror will be provided on the right side of the cab to view blind spot. The mirror will be mounted on a single stainless-steel arm off the lower cab corner.

The mirror will be designed and installed in a manner that prevents vibration.

EXTERIOR HANDRAILS, CAB

Four-(4) exterior handrails will be installed on the cab, one-(1) each side just rearward of the front doors and one-(1) each side just rearward of the rear doors. The handrails will be 24" in length and constructed from bright anodized aluminum with a slip-resistant finish. The handrails will be mounted with chrome plated end stanchions and will have a molded rubber gasket will be mounted between the handrails and the cab in order to prevent corrosion.

Each handrail will have a LED strip light running through the handle that will create a backlit appearance along the side of the vehicle. The back light will illuminate when the headlights are on.

The back light color will be white. The back light shall illuminate only with the park brake, not headlights.

FENDERETTES, BLACK RUBBER

The cab fenderettes will be black rubber securely fastened to the cab wheel wells on each side.

EXTERIOR TRIM, REAR CAB STEP WELL

The rear cab door stepping surfaces will be trimmed with aluminum tread plate. There will be tread plate covers that provide access to the chassis battery system.

CAB CORROSION PROTECTION AND SOUND DEADENING

The apparatus cab will be completely covered in one of two types of paint, prior to installation of any interior or exterior components, including insulation and floor mats. This process will be required to guard against corrosion as well as to keep the cab as quiet as possible for firefighters.

The entire underside and double wall area at the front of the cab will be cleaned, primed and sprayed with black F-Shield as a finish coat. This will include any areas that are not normally visible after the cab is complete.

The entire cab interior will be sprayed with F-Shield, as described later in these specifications. F-Shield will be sprayed over the ceiling, floor, side walls, forward fire wall, rear wall, dash, engine tunnel, interior cab doors and both sides of the cab door panels.

The cab exterior will be completely finish painted as described later in these specifications. This will include the areas under any optional rear wall or cab roof diamond plate overlays.

The fire department will, through the Virtual Manufacturing feature described earlier in these specifications, have the ability to see these areas covered with F-Shield prior to installation of items such as engine tunnel insulation, cab interior insulation and headliners, engine tunnel covering, floor mats, cab inner door panels, etc.

As a result of these cab corrosion protection measures, a ten-(10) year warranty against cab corrosion will be provided to the fire department.

INTERIOR CAB FINISH

The interior of the cab will be painted with a black "F-Shield". The cab metal finish will be covered with a coat of adhesion promoting primer.

The headliner (front and rear) and rear wall (if applicable) will be covered with heavy-duty black vinyl.

FLOOR MATS/ENGINE TUNNEL COVERING

The floor mats and engine tunnel will be covered with black pebble grain vinyl with 1/4" (.250") foam backing. The edges of the floor mats will be trimmed with a cast aluminum foot plate for a pleasing appearance.

INTERIOR TRIM, REAR WALL ALUMINUM PANEL

The entire interior rear wall of the cab will be covered with 3/16" (.1875") smooth aluminum plate coated with "F-Shield".

The color of the rear wall panel will match the interior of the cab.

CAB GRAB HANDLES, INTERIOR

Two-(2) interior grab handles installed in the cab on the "A" posts, one-(1) each side. The grab handles will be constructed of rubberized steel.

Four-(4) interior grab handles installed in the cab, one-(1) each side on top of the front door panels adjacent to fixed window and one-(1) each side on the rear door panels mounted diagonally. The grab handles will be constructed of 1-1/4" knurled stainless steel. The grab rails will be mounted with chrome plated end stanchions.

There will be one-(1) interior grab handle installed on the inside of each rear cab door. The handles will extend horizontally with width of the window just above the window sill. The grab handles will be constructed of bright stainless steel.

GLOVE BOX

The glove box will be an integral part of the welded aluminum dashboard assembly and located in front of the officer's seat. The door will be drop down style and constructed from aluminum with latch. The area above the glove box will be flat for a work surface or optional MDT mounting.

SUN VISORS

The cab will be equipped with two-(2) sun visors. The visors will be installed on the overhead panel and provide approximately 60 percent coverage across the width of the cab. The visors will be approximately 26" wide and 6" tall.

Sun visors shall be Rosco 841 black, padded visors.

REFLECTIVE STOP SIGNS

There will be four-(4) "STOP" signs installed in the cab, one-(1) on the lower door panel of each cab door.

EQUIPMENT MOUNTING PLATE. ENGINE TUNNEL

There will be one-(1) equipment mounting plate installed on the engine tunnel constructed of 3/16" smooth aluminum plate covered with "F-Shield".

Same as Tower Ladder JOB #6684.

STORAGE SHELF

There shall be one (1) storage shelf installed along the upper rear wall of the cab, above the forward-facing seats, approximately 8.00 inches down from the interior cab ceiling.

The shelf shall be fabricated out of .125-inch smooth aluminum and extend out approximately 8.00 inches from the rear wall.

The shelf shall have the same black F-Shield finish as the rest of the interior.
Webbing will be provided on front to allow for positive way of securing items on shelf.

INSTRUMENTATION

For easy viewing, gauges will be white faced with black lettering and adjustable intensity LED backlighting. The gauges will meet SAE J-1939 protocol to eliminate redundant sending units. The gauge

crystal will be flat glass with rubber O-ring seal. The panels will be divided into groups of instruments that make identification sensible and easy to view.

The following instruments will be included in the gauge panel in front of the driver:

Left Side-

An all-in-one gauge that contains; dial type tachometer, dial type engine oil pressure with warning light and alarm and dial type engine coolant temperature with warning light and alarm.

Center-

- Driver information display panel with alarm output for gauge warning lights
- Dial type transmission temperature gauge with warning light
- Dual diesel fuel/DEF level gauge with low level indicators

Right Side-

An all-in-one gauge that contains; dial type speedometer, dial type primary air pressure gauge with warning light and alarm and dial type secondary air pressure gauge with warning light.

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

- Air cleaner restriction light
- High beam indicator
- Parking brake indicator
- Turn signal indicators
- Low primary air
- Low secondary air
- Battery voltage error
- Door ajar
- Auto chassis lubrication system (if equipped)
- Emergency engine shutdown (if equipped)
- Diagnostic indicators for airbag (if equipped), engine, transmission and ABS

The electronic diagnostic connections for the engine, transmission, and ABS brakes will be located in the lower left firewall.

Service Access

The driver's instrumentation area will be made of textured black non-glare panels affixed to the aluminum dash. There will be a single gauge panel, secured with a bottom hinge and four-(4) quarter-turn fasteners. Access to the gauge clusters will be accomplished simply by releasing the latches and pulling the panel outward. Other gauge access designs are not acceptable.

The chassis electrical access panel will be located in the center of the aluminum dash, between the switch panel and the windshield. There will be a lift up cover, with two-(2) recessed lift-and-turn latches for quick access to the panel. The opening to the electrical will measure approximately 15" wide near the switch panel and 37" wide toward the windshield.

DRIVER'S INFORMATION DISPLAY

There will be a 10.8" x 2.44" display panel on the driver's gauge cluster that will illuminate various caution and warning indicator lamps. This display also contains a 340 x 90 monochrome LCD for display of specific and user selectable data. The display unit reads data from the J1939-11 power train communications network. Display will be capable of but not limited to the following features:

- Auto Self-Test
- Viewing the state of each digital or analog input to the unit
- Viewing the state of each output
- Allows users ability to set service reminders by distance or hours of operation
- Allows users ability to set data screens in various formats i.e. bar graph / text
- Viewable active and stored power train ECU fault data.
- Diagnostics screen allows user to select and view a specific source such as engine / transmission
- Display is selectable between English and metric readings.
- Messages and Icons will pop up in display when a condition exists such as: transmission oil life, filter or other service needed as reported by the Allison Transmission ECU engine conditions: low oil pressure, high coolant temperature, low coolant level, water in fuel, check / stop engine, regeneration needed, high exhaust temperature

Indicator lights may also accompany pop up messages:

Door ajar indicator will also pop up a "Do Not Move Vehicle, Check all doors and Items that Raise or extend beyond apparatus cab or body" message

ELECTRICAL SYSTEM, CHASSIS

The electrical system will consist of all solid-state components contained inside sealed aluminum castings and/or weatherproof Deutsch enclosures. Each module is to have a set of diagnostic LED indicators. All inputs and outputs will be configured into a scalable electrical harness utilizing Deutsch connectors. The modules will not have special mounting requirements.

The system will consist of a main solid-state control module and the appropriate combination of solid-state distribution modules, switch modules, and other solid-state modules as required for the application. The system will also include a 5-inch screen mounted in the driver side overhead area. This screen will display door ajar & seat belt warnings, electrical system diagnostics and informational screens. The electrical system will also utilize programable Smart Switches, these switches will utilize both ICON and text engraved covers. The switches will be backlit Red when the system is powered up & the switch is not active. When the switch is activated, the ICON on the switch will change color to either, Green, Blue or Cyan, depending on the switch function.

The system, at a minimum, will be capable of performing the following functions:

- Load management and sequencing
- Switch loads
- Receive digital and analog signals
- Perform and report diagnostics
- Continuously report vehicle status
- System is expandable

The main solid-state control module will have an integrated Load Manager. The Load Manager Sequencer will assure that loads are applied and removed gradually, thus eliminating the possibility of inducing failures in the vehicle's equipment.

The load manager will be a precision, solid state controller which sequentially switches "ON" multiple circuits at 1/2 second intervals. The sequencer will be initiated by the "Emergency Master" switch. The sequencer priority will be set at the apparatus pre-build conference.

The Load Manager will monitor the vehicles battery voltage. Loads may be shed at any voltage at one tenth of volt increments. A low voltage warning may be set at any set point (usually 11.5 volts). The load

manager can shed any output that is controlled by the system (there is no limit to the number of loads that may be managed by the network).

The load shed priority will be set by the circuit significance, followed closely by circuit draw. The Load Manager will shed loads until the voltage level begins to rise.

A voltage monitor will be built into the electrical system. It will activate a warning when the alternator output voltage falls below any desired voltage (usually 11.8 volts).

Placement of modules within the cab enables a reduction in wire harness bundles. Elimination of redundant harnessing and separate circuit boards, relay and circuit breakers & electrical hardware. Reducing separate electrical or interlock subsystems and associated electronics for controlling various electrical loads and inputs.

The electrical system will utilize a Controller Area Network (J1939) protocol to provide control signals for "real time" operation.

The electrical system will be field reprogrammed and re-configurable by an authorized service center. This complete system eliminates the need for the following separate components or devices: load manager, load sequencer, warning lamp flasher, headlamp flasher, door open notification system, interlock modules, and VDR.

The base system includes:

- Total Load Management
- Load Shedding Capabilities
- Load Sequencing Capabilities
- On- Board Diagnostics Readout
- Very reliable, solid- state hardware
- Error Reporting
- Continuous system monitoring and reporting
- Emergency warning lamp flasher
- Field Configurable
- Expandability Capabilities
- Advanced PC Diagnostics
- VDR

The wiring harness will conform to SAE J-1128 with GXL temperature properties. All exposed wiring will be run in loom with a minimum 289 °F rating. All wiring looms will be properly supported and attached to body members along the entire run. All wiring will be mounted as to provide protection from water and heat. All connections will be crimp type with heat shrink tubing with insulated shanks to resist moisture and foreign debris such as grease and road grime. Weather resistant connectors will be provided throughout to ensure the integrity of the electrical system. Gold contacts will be used where required for superior connectivity and improved performance. All wiring looms will be properly supported and attached along the entire run. At any point where wire or looms must pass through metal, rubber grommets will be installed to protect the wire from abrasion.

Wiring will be individually and permanently numbered, function and color-coded using an indexing numbering system in which all circuits are categorized by function and will be permanently marked every three-(3) inches on the insulation to allow for easy identification.

All internal wire end terminals, including locking bulkhead connectors, will be mechanically affixed to the wire ends by machine terminal crimping presses. No hand-crimped terminals will be acceptable.

All internal splices will be ultrasonically welded connections - no butt style connections will be acceptable. All internal wiring will be of the high temperature GXL type wire and will be protected by wiring duct wherever possible.

As programmed electrical system reports will be generated by the electrical system software and furnished in the apparatus manuals. A master circuit list of electrical circuits that the apparatus builder installs will be furnished in the delivery manuals.

MAIN CENTER DASH

The main center dash area will include three-(3) removable panels located one-(1) to the right of the driver position, one-(1) in the center of the dash and one-(1) to the left of the officer position.

A Gentex GENHLBP1 garage door opener switch shall be supplied and installed in the cab dash. Final location TBD at pre-construction conference.

ACCESSORY PANEL, BLUE SEA

There will be a blue sea model 4365 12-volt accessory panel. The panel will be equipped with one-(1) 12-volt socket outlet and two-(2) 2.1-amp USB connections.

The panel will be wired to direct battery power with the appropriate wire size and fuse.

The panel will be in the center emergency switch panel below the Whelen siren.

ELECTRONIC SIREN

There will be one-(1) Whelen model 295SLSA1 siren provided in the cab. The siren amplifier will incorporate a 12V/200W siren installed on an aluminum alloy chassis covered by a black polycarbonate powder coated housing for maximum protection. The 295SLSA1 will have the ability for either 100- or 200-watt output. The front overlay will be made of velvet Lexan™ with a matte finish. The lettering and artwork on the overlay will be illuminated with adjustable backlighting of soft LED non-glaring green. The operating controls will consist of a power switch, manual button, PA volume switch, horn button, and rotary switch. The 295SLSA1 PC board will have input polarity protection, output short circuit protection. The siren amplifier will include a 20A/32V fuse. The solid-state siren speaker amplifier will be vibration resistant. The microphone will be hardwired to the 295SLSA1.

The 295SLSA1 will have 21 Scan-Lock™ siren tones with two manual functions for additional siren tones. The siren amplifier will have the ability to customize the placement of each siren tone with the rotary switch. The siren amplifier will have a “Siren in Use” icon driver and adjustable preset repeat radio volume. The 295SLSA1 will have a “Park Kill” feature that disables the siren when the vehicle is in park. The PTT (push to talk) switch on the microphone will override all siren functions. The 295SLSA1 will have a combination On/Off and horn ring transfer switch with Bi-polarity horn/ring activation control. The 295SLSA1 will have SI Test® capability to perform a complete diagnostic silent test of amplifier and speaker(s). The siren amplifier will have a quick disconnect plug. The 295SLSA1 will have the ability to activate siren tones with “Aux Enable” input either with a slide switch, power controls, or relay-to-ground connector. The 295SLSA1 will meet Class A requirement for SAE, AMECA, KKK1822, and California Title XII. The siren amplifier will have an adjustable bail bracket with installation hardware. The 295SLSA1 is covered by a two-year factory warranty.

360° CAMERA WITH 18 INFRARED ILLUMINATORS & 7" DIGITAL MONITOR

A Fire Research inView™ TrueSight™ model BCA111-A00 kit will include: (1) one 130° camera with 18 infrared illuminators and one-(1) 7" digital monitor camera will be able to show 360° view of the perimeter of the truck.

The 360° Camera will include the following features: 1/3" SONY® Color CCD Sensor, 250,000 pixels for Picture Elements and Gamma Correction with R=0.45 to 1.0. Camera will have Mirror Image capability. (1) One 66 ft. Extension Cable will be included for the camera. (1) One Screw Kit will be provided for camera installation. The camera will have a built-in high gain microphone. The Image Sensor will provide 600 TV Lines PAL: 500(H) *582(V), NTSC: 510(H) *492(V). The 2.1MM Lens will have a 130° Viewing Angle. The Waterproof rating will be IP69K. The 130° Camera will include an Internal Synchronization Sync System. Infrared Distance will be 50 Ft. (18 Infrared IR). The Usable Illumination will be 0 Lux (with IR ON). The Power Source will be DC 12V (+/-10%). Signal-to-Noise ratio (S/N Ratio) will be rated for higher than 48DB. The Electronic Iris rating will be 1/50, 1/60-1/100,000 seconds. Video Output rating will be 1VP.P 75 Ω. The IR Switch Control will have a CDS Automatic Control. Vibration and Impact Rating will be 20G/100G. The Operating and Storage Temperature ratings both will be -40°F ~ +176°F / RH 95% Max.

The model BCA111-A00 kit will also include one-(1) 7" TFT LCD Digital Color Monitor. The specifications will be as follows for the monitor:

Dot Resolution: 800 x 3 (RGB) x 480
Display Format/Contrast: 16:9 / 500:1
Display Brightness: 400 CD/m²
Viewing Angle: U:50° D:60° L/R:70°
3 Channel Video Input
1 VP-P, 75Ω
Power Supply – DC 12V-24V (+/-10%)
Power Consumption – 5W
Operating Temperature: -22°F ~ +176°F
Video System: Auto NTSC/PAL
Overall Dimensions: 7" (L) x 5" (H) x 1" (D)
Weight: 400G
Vibration Rating: 5G
Dot Pitch: 0.192 (H) x 0.1805 (V)
Internal Sync System

The monitor will be located in the left front cab corner.

STEERING COLUMN

The steering column will be a Douglas Autotec tilt and telescope. A lever mounted on the side of the column will control the tilt and telescope features. A Signal-Stat (self-canceling) turn signal switch will be mounted to the column. The steering shaft from the column to the meter box will have a rubber boot to cover the shaft slip and a second rubber boot to seal the passage hole in the floor.

The steering wheel will be 18 inches in diameter.

The Signal-Stat turn signal switch will include the following functions:

- Left and right turn signals
- High beam dimmer control
- Hazard warning switch
- Two speed with intermittent windshield wiper control
- Windshield washer control

SPEEDOMETER, OFFICER'S SIDE

A 3" speedometer will be provided on the right side of the cab to enable the officer to monitor driving speed.

12-VOLT FUSE BLOCK(S)

There will be three (3) Blue Sea fuse block(s) 5025 installed in a location determined by the customer. The unit will include a six-(6) 12-volt constant power supply ports and grounding buss with easily changeable fuses. The unit will have a 100-amp total operating range.

Locations:

- on side of engine tunnel behind driver's seat
- on side of engine tunnel behind officer's seat
- above shelf on the upper rear crew cab wall

RADIO

A Jensen brand heavy-duty radio with weather band, AM/FM stereo receiver and Bluetooth capabilities will be installed in a customer specified location. Radio will be the current, commercially available heavy-duty single-DIN automotive model at time of vehicle manufacturing date.

A small antenna will be located on the cab roof for AM/FM and weather band reception.

There will be two-(2) speakers installed in the front portion of the cab recessed overhead and two-(2) speakers installed in the rear portion of the cab overhead. The speakers will be provided for connection to the sound system.

RADIO ANTENNA / WIRING

one (1) antenna base(s), for use with an NMO type antenna, will be mounted on the cab roof so not to interfere with light bars or other roof mounted equipment. The antenna base will include 17' of RG58 A/U cable with no connector at the radio end of the cable. The antenna base design provides the most corrosion resistance and best power transfer available from a high temper all brass construction and gold-plated contact design.

ACCESSORY POWER

The electrical distribution panel will include two-(2) power studs. The studs will be size #10 and each of the power studs will be circuit protected with a fuse of the specified amperage. One-(1) power stud will be capable of carrying up to a 40-amp battery direct load and one-(1) power stud will be capable of carrying up to a 20-amp ignition switched load. The two-(2) power studs will share one-(1) #10 ground stud.

An additional set of power and ground studs shall be located behind the officer's seat, shall be labeled and have a protective cover to prevent accidental engagement.

HORN, ELECTRIC

A single electric horn activated by the steering wheel horn button will be provided.

BACK-UP ALARM

There will be one-(1) NFPA compliant electronic back-up alarm installed at the rear of the apparatus. The alarm will be wired to the transmissions output signal and is automatically activated when the transmission is shifted into reverse.

LIGHTS, CAB DOME

Four-(4) Whelen 6" Round Super-LED model 60CREGCS will be provided in the cab's headliner. The steady burn 12v interior light will incorporate six red and six clear Super-LEDs and a clear non-optic translucent hard coated polycarbonate lens for maximum output. The hard coated lens will provide extended life/luster protection against UV and chemical stresses. The conformal coated PC board and foam in place gasket will provide additional protection against environmental elements. The 60CREGCS includes Hi/Low intensity mode standards and On/Off dual switch function. The solid-state interior light will be vibration resistant. The interior light is covered by a five-year factory warranty

The white LED lights will be activated when any cab door is in the open position automatically switching off all red lights currently on and reactivated when the door is closed.

MULTIPLE DOOR AND SAFETY WARNING INDICATOR PANEL

There will be a door ajar and safety warning light system with indicator panel located in the cab. The panel is mounted to the ceiling between the driver and the officer. The indicator panel has multiple LED lights that activate under one or all of the following conditions:

- *Cab door is open
- *Compartment door is open

An audible alarm will be installed in conjunction with the door-ajar warning light system. The panel only operates when the ignition switch is in the "On" position and the parking brake released.

Individual door ajar panel warning display and system will only be accepted.

LIGHTS, STEP WELL

There will be two-(2) LED illumination lights installed in each front cab door step well and one-(1) in each rear cab door step well. The lights will activate when the cab door is opened.

LIGHTS, ENGINE MAINTENANCE

There will be two-(2) LED lights mounted under the cab. The lights will automatically activate when the cab is tilted.

FRONT LIGHTING

The headlamps, turn signals, front warning and intersection lights will be located within chrome warning light modules, one-(1) each side front of the apparatus.

HEADLIGHTS

Four-(4) FireTech LED rectangular headlights model FT-4X6-4KIT will be installed in the warning light modules, two-(2) each side. The headlights will be mounted in the upper positions of the module.

The kit will consist of 2 fixtures which operate as SAE VOR “high/low” beams, and 2 fixtures which operate as SAE VO “high-only” beams. All 4 headlights will have a SAE “P” parking lamp halo surrounding the driving beams, which will be energized any time the vehicle marker lights are turned “on” (first click of the headlight switch). Optically, on the high/low headlight, an articulated set of elliptical optics must be used to illuminate the foreground while operating in “low” beam mode. The lens of the high/low beam headlight will be marked “DOT VOR SAE HL P 16.” The lens of the high-only beam will be marked “DOT VO SAE HL P 16.” All circuits of the headlights will be designed to operate from 9-32v DC.

All 4 fixtures must be manufactured such that the internal pressure of the headlight remains constant regardless of operating temperature. The housing will be equipped with a mechanically fastened GORE PolyVent. Similar functioning vent materials affixed to the housing using adhesive will not be acceptable for substitution.

The headlights will be installed, wired, and aimed, in accordance with FMVSS108. The manufacturer of the headlights will warrant the headlights against defects for the life of the apparatus.

TURN SIGNALS. FRONT

Two-(2) Whelen 600 series 5mm LED model 60A00TAR turn signal lamps will be installed, one-(1) each side directly below the low beam headlights in the warning light modules.

LIGHTS. TURN SIGNAL/MARKER

Two-(2) Whelen 400 series model 40A00AAR amber LED lights will be mounted, one-(1) each side outboard of the turn signal at a 45-degree angle off the front of the cab. The lights will be part of the warning light module and are visible from both the front and sides of the vehicle.

LIGHTS. LED CORNERING

Two-(2) Whelen 400 series model 40R02Z*R flashing LED cornering lights will be mounted, one-(1) each side below the marker lights in the warning light module. The lights will be mounted at a 45-degree angle off the front of the cab and are visible from the sides and front of the vehicle. The warning light will incorporate four red Super-LED, an optic hard coated polycarbonate lens, and utilize a metalized reflector with integrated TIR hybrid optics for maximum output. The hard coated lens will provide extended life/luster protection against UV and chemical stresses. The conformal coated PC board and with the lens fitted with foam in place gasket assembly will provide additional protection against environmental elements. The solid-state warning lights will be vibration resistant. The self-contained flashing light will have 25 Scan-Lock™ flash patterns including synchronize feature and steady burn. An installation kit including mounting hardware and rubber gasket will be provided for surface mounting. The 40R02Z*R will contain a 12” non-terminated pigtail. The warning light is covered by a five-year factory warranty.

LIGHTS. FRONT DOT

There will be five-(5) Whelen OS series LED marker lights installed on the cabs roof located as high as practical and spaced per DOT guidelines.

LIGHTS. INBOARD LOWER FRONT

Two-(2) Whelen 600 Series Super-LED model 60R02FRR lights will be installed, inboard of the turn signal in the warning light modules. The warning lights will incorporate red Super-LEDs, a red non-optic hard coated polycarbonate lens, clear optic collimator and utilize a metalized reflector for maximum output. The warning lights is covered by a five-year factory warranty.

LIGHTS. CAB WHEEL WELL DIRECTIONAL

Two-(2) Britax 428.111.12V auxiliary side directional/marker lights will be provided, one-(1) each side, in the cab wheel well area and wired to the running lights & turn signals.

LIGHTS. CAB GROUND

There will be one-(1) LED light mounted under each cab door illuminating the area below providing a safe entrance and exit for cab occupants. All cab ground lights will automatically activate when any cab door is opened and by a switch located on the dash.

SAFETY SIGNS. GENERAL REOUREMENTS

Safety signs with text will conform to the general principles of ANSI/NEMA Z535.4, *Product Safety Signs and Labels*. Safety signs without text will conform to the general principles for two-panel safety signs of ISO 9244, *Earth-Moving Machinery - Machine Safety Labels*.

Apparatus built for sale in the United States will employ safety signage that complies with ANSI/NEMA Z535.4.

Apparatus built for sale outside the United States will employ safety signage that complies with ANSI/NEMA Z535.4 or ISO 9244.

Safety signs referenced in this standard beginning with the letters FAMA will conform to the text and graphics of the referenced safety sign number found in FAMA TC010, *Standard Product Safety Sign Catalog for Automotive Fire Apparatus*.

SAFETY SIGNS. BATTERY EXPLOSION

A safety sign(s) FAMA01, will be provided near the battery location that warns of potential injury or death that could be caused by the batteries. The label will also state precautions that should be taken while working on or around the batteries.

SAFETY SIGNS. ROTATING SHAFTS

Safety signs FAMA02, will be provided on each side of the frame rail and in any other location(s) where rotating shaft hazards are apparent. The label will warn of potential injury or death that could be caused

by the movement of the shaft(s) as well as precautions that should be taken while working on or around them.

SAFETY SIGNS. HOT SURFACES

Safety sign(s) FAMA03, will be provided near any hot surface that warns of potential injury or death that could be caused by contact with the surface. The label will also state precautions that should be taken while working on or around the surface.

SAFETY SIGNS. HOT EXHAUST

A safety sign FAMA04, will be provided near any hot exhaust surface that warns of potential injury or death that could be caused by contact with the surface. The label will also state precautions that should be taken while working on or around the surface.

SAFETY SIGN. SPINNING FAN

A safety sign FAMA05, will be provided on both sides of the engine fan. The label will warn of potential injury or death that could be caused by the movement of the fan as well as precautions that should be taken while working on or around them.

SAFETY SIGNS. SEATED & BELTED

Safety signs FAMA07, which warns of the importance of seat belt use, will be visible from each seat that is intended to be occupied while the vehicle is in motion.

SAFETY SIGN. AIR CONDITIONING REFRIGERANT

If the apparatus is equipped with any type of air conditioning system, a safety sign FAMA09, will be provided that is located in an area that would be visible to service personnel. The label will state that the system contains R134A, the necessary precautions that should be taken and the dangers of working on or around the system.

SAFETY SIGN. CAB EQUIPMENT MOUNTING

A safety sign FAMA10, which warns of the need to secure items in the cab, will be visible inside the cab.

SAFETY SIGN. FIRE SERVICE TIRE RATING

A safety sign FAMA12, which warns of the special requirements for fire service-rated tires, will be visible to the driver entering the cab of any apparatus so equipped.

SAFETY SIGN. ELECTRONIC STABILITY CONTROL

If the apparatus is equipped with an electronic stability control system, a safety sign FAMA13, will be provided inside of the cab in view of the driver warning of the dangers of improper operation of the apparatus and the importance of safe driving. The label will also warn of potential injury or death that could be caused by improper operation of the apparatus.

SAFETY SIGN. CAB SEATING

A safety sign FAMA14 will be located in the cab visible to the operator.

The sign will read: Capacity for 8 persons

SAFETY SIGNS. HELMET WORN IN CAB

A safety sign FAMA15, which warns not to wear helmets while the vehicle is in motion, will be visible from each seat that is intended to be occupied while the vehicle is in motion.

SAFETY SIGN. VEHICLE BACKING

A safety sign FAMA17, will be provided inside of the cab in view of the driver advising of proper procedures to following when the apparatus is in reverse motion. The label will also warn of potential injury or death that be caused by failing to follow proper procedures.

SAFETY SIGNS. INTAKE/DISCHARGE CAP PRESSURES

If the apparatus is equipped with a pump system, safety signs FAMA18, will be provided in all areas that intakes and discharges are capped. The label will give instruction on how to properly remove the cap. The label will also warn of potential dangers, injury or death that be caused by failing to follow proper cap removal procedures.

SAFETY SIGNS. HOSE RESTRAINT REQUIRED

A safety sign FAMA22, which warns of the need to secure hose, will be visible to personnel at each hose storage area.

SAFETY SIGNS. CLIMBING METHOD INSTRUCTION

Safety signs FAMA23, which warns of the proper climbing method, will be visible to personnel entering the cab and at each designated climbing location on the body.

SAFETY SIGNS. RIDING ON EXTERIOR

Safety signs FAMA24, which warns personnel not to ride on the vehicle, will be located at the rear step areas and at any cross walkways.

SAFETY SIGN. PUMP TRAINING

A safety sign FAMA25, which warns of the need for training prior to operating the apparatus, will be located on the pump operator's panel.

SAFETY SIGNS. NO-STEP

Safety signs FAMA26, will be provided in any horizontal location that a firefighter may feel tempted to use as a step but is not designed, constructed or intended to be a stepping, standing or walking surface. The label will state that the surface is not intended for this purpose and indicate potential injury or death in doing so.

SAFETY SIGN, SIREN NOISE

A safety sign FAMA42, will be provided inside the driver's door warning of potential injury that could be received from the noise of the siren. The label will also state safety precautions that should be taken when the siren is in use.

SAFETY SIGN, APPARATUS MOVEMENT

A permanently affixed movement warning plate will be installed near the door ajar light that reads:

"DO NOT MOVE APPARATUS WHEN LIGHT IS ON".

PLATE, FLUID CAPACITY

A permanently affixed fluid data plate will be installed in the driving compartment to indicate the type and quantities of the following fluid used in the vehicle.

Engine Oil
Engine Coolant
Chassis Transmission Fluid
Pump Transmission Lubrication Fluid (if applicable)
Pump Primer Fluid (if applicable)
Drive Axle Lubrication Fluid
Air Conditioning Refrigerant
Air Conditioning Lubrication Oil
Power Steering Fluid
Cab Tilt Mechanism Fluid
Transfer Case Fluid
Equipment Rack Fluid
Air Compressor System Lubricant
Generator System Lubricant
Front Tire Pressure - Cold
Rear Tire Pressure - Cold

The following information will also be supplied on the fluid data plate:

Chassis Manufacturer
Production Number
Paint Number
Year Built
Date Shipped
Vehicle Identification Number

PLATE, OVERALL HEIGHT / LENGTH / WEIGHT

An overall height / length / weight information plate will be installed that can be clearly identified and visible to the driver while in the seated position showing the apparatus completed overall height, length, (in feet and inches) and gross vehicle weight (in tons) current to the apparatus manufactured date.

If changes to the vehicle occur while in service, the department must revise the overall height-length-weight plate.

PUMP ENCLOSURE, SIDE CONTROL

The pump enclosure superstructure will be constructed of aluminum tubing, channel, angle, and break-formed components. The framework will be formed by beveled aluminum alloy extrusions and electrically seam welded both internally and externally at each joint using 5356 aluminum alloy welding wire. The main, frame work will be constructed of 3.00 x 3.50, 6063-T6 aluminum extrusions. The break-formed components will be constructed from 3/16" (1.875) aluminum.

The cross members support the substructure and the exterior panels independently from the cab and body. The cross members will be isolated from the frame rails using torsion mounts. The pump enclosure will be supported at the top of the frame rails, in a minimum of four-(4) places. The module will be secured with angle brackets bolted to both the pump enclosure support cross rails and the side of the chassis frame rails. This design is required to eliminate shifting and stress on the pump enclosure, pump panels, and running boards.

The front of the pump module will be covered with aluminum tread plate to keep road debris from the front of the pump.

Any pump enclosure constructed using any material other than aluminum or utilizing any other mounting method is not acceptable.

PUMP MODULE

The pump compartment will be at the forward section of the body, integral with the remainder of the structure. Pump panels on both sides of the vehicle will be concealed by roll up doors. This design is required to minimize the effects of the elements on the pump panel components and to maximize usable compartment space on the apparatus.

The forward section of the pump compartment will be readily accessible for easy service on the pump and plumbing. Removal of the speedlay reloading trays will allow full access to the pump compartment. Removal of the backboard storage sleeve will further improve the service access.

Speedlays will be located ahead of the pump compartment, with one-(1) 1-3/4" and one-(1) 2-1/2" located at frame rail height, approximately 43" above street level and one-(1) 1-3/4" located above the rear 2-1/2" speedlay. The forward 1-3/4" speedlay will be located under the cab notch.

The pump enclosure will provide an area above the pump for the installation of deck gun plumbing in the dunnage area.

MVP pump compartments are to be left OPEN, no roll-up doors.

The floor areas shall have full width recessed hose trays on each side. The left side shall have capacity for 35 ft of 5" hose, right/ officer's side shall have 35 ft of 5" hose and (2) fire extinguishers.

No lower 1-3/4" X-Lay under cab area, No Cab notch. Remove decking between upper and lower speedlays, make (1) dry speedlay with removable tray as tall as space permits, at frame height.

DUNNAGE AREA

An open area above the pump enclosure will be provided for additional equipment storage and will be constructed from aluminum tread plate. The storage area will be welded and be removable.

PUMP PANELS

The operator's controls and gauges will be mounted on pump panels constructed of 1/8" (.125) black anodized, non-glare aluminum. No vinyl coverings will be acceptable as these surfaces are subjected to rough service and vinyl is susceptible to tearing.

The operator's master gauge panel will be vertically hinged with push style latch for access to gauges and auxiliary controls.

The operator's control panel will be located below the master gauge panel and constructed of 1/8" (.125) black anodized, non-glare aluminum.

All gauges and controls will be properly identified with color-coded metal tags. The tags will be affixed with industrial adhesive. The gauges will be functionally grouped above each control.

The right-side upper panel will be vertically hinged with double doors and push style latches for pump compartment access. The doors will be constructed of 1/8" (.125) black anodized, non-glare aluminum.

The right-side lower panel will be removable for serviceability. The panel will be constructed of 1/8" (.125) black anodized, non-glare aluminum.

All instruments and controls will be provided and installed as a group at the pump panel. The central midpoint or centerline of any valve control will be no more than 72" vertically above the ground or platform that is designed to serve as the operator's standing position. The instruments will be placed to keep the pump operator as far as practical from all discharge and intake connections and in a location where they are readily visible and operationally functional while the operator remains stationary.

A safety sign FAMA25, which warns of the need for training prior to operating the apparatus, will be located on the pump operator's panel.

FULLY HINGED PUMP PANEL, RIGHT SIDE

The right-side pump panel will be full hinged for ease of access to the pump compartment for routine maintenance / repairs.

PUMP PANEL LIGHT, LEFT SIDE

One-(1) full width LED strip light will be mounted under a light shield above the left pump panel. The light will be control with a on the pump operator's panel.

PUMP PANEL LIGHT, RIGHT SIDE

One-(1) full width LED strip light will be mounted under a light shield above the right pump panel. The light will be control with a on the pump operator's panel.

PUMP PANEL LIGHT ACTIVATION

The pump panel lights on the operator's panel will also activate when the pump is shifted into gear.

LIGHT, PUMP COMPARTMENT

One-(1) LED strip light will be installed in the pump compartment for inspection or routine maintenance of the pump. The light will be wired to the panel light switch.

SPEAKER, PUMP PANEL

There will be a Motorola exterior speaker surface mounted on pump panel.

Shall be a Motorola HSN4018C speaker.

One speaker shall be wired to the low band mobile radio.

Speaker shall be mounted in pump panel area, high and out of the way of controls, facing downward

AIR OUTLET, PUMP PANEL

There will be one (1) air outlet(s) complete with shutoff valve installed on the pump panel. The outlet will be plumbed to the chassis air system.

There will be a 25' of .375" utility type air hose with quick release type fittings compatible with those on the apparatus provided.

AIR HORN SWITCH, PUMP PANEL

There will be a push button momentary switch mounted on the pump panel to activate the chassis air horn(s).

FLOWMETER / PRESSURE INDICATOR(S)

There will be eight (8) Fire Research Insight Ultimate FPA400-0XX combination digital flowmeter and pressure indicator kit(s) installed for the specified discharge(s). Each flowmeter will have a LED display with super bright digits more than 3/8" high. The flow rate will be displayed in GPM.

Each module will have an analog display for pressure with an expanded scale in the normal operating range for more accurate readings. The pressure indicator input and movement will be electronic. Pressure will be displayed in PSI.

Each flow meter shall be color coded.

PUMP PANEL TAGS

Shall be **VISION MARK** color coded **RINGS** and **TAGS** only.

FUEL LEVEL GAUGE

A 2" fuel level gauge will be provided on pump panel.

PUMP HOUR METER, PUMP PANEL

A 2" pump hour meter (indicating accumulative hours during pump operation) will be located on the pump panel.

PUMP SYSTEM, WATEROUS CSU SINGLE STAGE

PUMP ASSEMBLY

The pump will be of single stage construction and comply with all applicable requirements of the latest standards for automotive fire apparatus of the National Fire Protection Association.

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

The pump body will be closed-grained gray iron and must be horizontally split in two sections for easy removal of the entire 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 will be bolted together on a single horizontal face to minimize leakage and facilitate reassembly.

The discharge manifold will be cast as an integral part of the pump body assembly and provide at least three full 3-1/2" openings located one outlet on the right side of the pump body, one outlet on the left side of the pump body, and one outlet directly on top of the pump discharge manifold.

The impeller will be bronze with double suction inlets, accurately balanced (mechanically and hydraulically), of mixed flow design with reverse-flow, labyrinth-type, and utilize wear rings that resist water bypass and loss of efficiency due to wear.

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

The impeller shaft will be stainless steel, accurately ground to size, and supported at each end by oil or grease-lubricated anti-friction ball bearings for rigid and precise support. Bearings will be protected from water and sediment by suitable stuffing boxes, flinger rings, and oil seals. The impeller shaft will 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 will be used.

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

For chassis equipped with automatic transmissions, the pump transmission drive line will have a torque-rating equal to or greater than the maximum net engine torque multiplied times the first gear ratio and torque converter ratio.

The suction fittings will include removable, die cast, zinc screens that are designed to provide cathodic protection for the pump, thus reducing corrosion in the pump.

A 3" clapper check valve will be installed between the suction side of the pump and the tank-to-pump valve. This 3" clapper valve will eliminate the possibility of a pressure surge expanding the water tank.

Pump system will utilize an integral discharge manifold system that allows a direct flow of water to all discharge valves.

PACKING GLANDS

The stuffing boxes will be integral with the pump body and be equipped with two-piece glands to permit adjustment or replacement of packing without disturbing the pump. Lantern rings will be located at inner ends of stuffing boxes so that all rings of packing can be removed without removal of the lantern rings. Water will be fed into stuffing box lantern rings for proper lubrication and cooling when the pump is operating.

IMPELLER HUB, FLAME PLATED

The impeller will have a flame-plated hub to assure maximum pump lift and efficiency despite the presence of abrasive particles, such as fine sand in the water being pumped.

PUMP SHIFT

An air operated pump shift will be installed in the chassis cab to engage the fire pump. Provisions will be made for placing the pump drive system in operation using controls and switches that are clearly identified and within convenient reach of the operator while in the cab.

A green indicator light will be installed on the cab dash and labeled "Pump Engaged".

Where an automatic chassis transmission is provided, a green indicator light in the driving compartment and a green indicator light located at the pump operator's position will be provided and will be energized when both the pump shift has been completed and the chassis transmission is engaged in pump gear.

The light in the driving compartment will be labeled "OK TO PUMP". The light on the pump operator will be positioned adjacent to and preferably above the throttle control and will be labeled "Warning: DO NOT OPEN THROTTLE UNLESS LIGHT IS ON". The green light on the pump operator's panel will be energized when the pump is engaged, the transmission is in drive, and the parking brake is set.

PUMP ANODE(S)

Two (2) replaceable pump anode(s) will be installed on the pump for corrosion protection.

These anodes will be constructed with alloy meeting MIL-A-24779 (no exceptions). The anodes will have a central stainless-steel core to prevent anode breakage that can lead to clogged nozzles.

VALVE, MASTER DRAIN

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

VALVES, INDIVIDUAL DRAIN

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

One-(1) individual Innovative Control lift up drain valve will be furnished for each 1-1/2" or larger discharge port and each 2-1/2" gated auxiliary suction.

Drain valves will be located at the bottom of the side pump module panels. All drains and bleeders will discharge below the running boards.

PUMP TEST POINTS

Two-(2) test plugs will be pump panel mounted for testing of vacuum and pressures.

PUMP TEST CERTIFICATION PLATE

A permanently affixed plate will be installed at the pump operator's panel. It will provide the rated discharge and pressures together with the speed of the engine as determined by the certification test for each unit. It will also provide the position of the parallel/series pump used and the no load governed speed of the engine as stated by the engine manufacturer on a certified brake horsepower curve.

A label will be provided on the pump operator's panel that states the following:

"Warning: Death or serious injury might occur if proper operating procedures are not followed". The pump operator as well as individuals connecting supply or discharge hoses to the apparatus must be familiar with water hydraulics hazards and component limitations.

PLUMBING SYSTEM

All inlet and outlet lines will be plumbed with either, stainless steel pipe, flexible polypropylene tubing or synthetic rubber hose reinforced with hi-tensile polyester braid. All hoses will be equipped with stainless steel couplings. All stainless-steel hard plumbing will be a minimum of a schedule 10 wall thickness. Where vibration or chassis flexing may damage or loosen piping or where a coupling is required for servicing, the piping will be equipped with Victaulic or rubber couplings. Plumbing manifold bodies will be ductile cast iron or stainless steel. All piping lines are to be drained through a master drain valve or will be equipped with individual drain valves. All drain lines will be extended with a hose to drain below the chassis frame. All water carrying gauge lines will be of flexible polypropylene tubing. All piping, hose and fittings will have a minimum of a 500 PSI hydrodynamic pressure rating.

PUMP/PLUMBING PAINTING

The fire pump will be painted to the color determined by the Fire Department. This includes all intakes, discharges, manifolds, and associated valves.

Painted all job color red.

PRIMING SYSTEM, PUMP

The priming pump will be a 12-volt Waterous model VPO Oil-Less, positive displacement vane type, electrically driven conforming to the standards outlined in the current edition of NFPA. One-(1) priming control will open the priming valve and start the priming motor. The primer will be capable of priming

without the use of primer oil. The primer will be connected to the power source with a 300-amp fusible link.

A Vacuum Activated Priming valve (VAP), consists of a stainless-steel valve stem, spring and pressure disk in a plastic valve body. A rubber disk forms the seat for the valve stem and also forms a seal between the priming valve inlet and the pump body. A rubber diaphragm forms a seal which allows the valve to open and close while isolating the interior of the priming valve from atmospheric pressure.

Provide Watrous large push button control only.

PUMP CERTIFICATION, 2000 GPM

The pump when dry, will be capable of taking suction and discharging water in accordance with current NFPA 1900. The pump will be tested at the manufacturer's facility by an independent, third-party testing service. The conditions of the pump test will be as outlined in current NFPA 1900. The tests will include, at minimum, the pump test, the pumping engine overload test, the pressure control system test, the priming device tests, the vacuum test, and the water tank to pump flow test as outlined in current NFPA 1900.

A Piping hydrostatic test will be performed as outlined in current NFPA 1900.

The pump will meet and perform the following test to receive certification:

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

PRESSURE GOVERNOR, MONITORING, and MASTER PRESSURE DISPLAY

Fire Research PRO-T series PRA301-D00 pressure governor and monitoring display kit will be installed. The kit will include a control module, intake pressure sensor, discharge pressure sensor, and cables. The control module case will be waterproof and have dimensions not to exceed 5 1/2" high by 10 1/2" wide by 2" deep. Inputs for monitored information and outputs for engine control will be on the J1939 data bus.

The following continuous displays will 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
Dot matrix message display
Throttle ready LED
Pressure / RPM setting display
Pressure and RPM operating mode LEDs
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 will show diagnostic and warning messages as they occur. It will show monitored apparatus information, stored data, and program options when selected by the operator. All LED intensity will be automatically adjusted for day and night time operation.

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

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

The program features will be accessed via push buttons located on the front of the control panel. There will be an 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 will be electrical. The discharge pressure display will show pressures from 0 to 600 psi. The intake pressure display will show pressures from -30 in. Hg to 600 psi.

The governor will operate in two control modes, pressure and RPM. No discharge pressure or engine RPM variation will occur when switching between modes. A throttle ready LED will light when the interlock signal is recognized. The governor will start in pressure mode and set the engine RPM to idle. In pressure mode the governor will automatically regulate the discharge pressure at the level set by the operator. In RPM mode the governor will maintain the engine RPM at the level set by the operator except in the event of a discharge pressure increase. The governor will limit a discharge pressure increase in RPM mode to a maximum of 30 psi. Other safety features will 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 will be programmed to interface with a Cummins engine.

An additional 3/4-inch diameter green indicator light shall be installed near the throttle to indicate "OK to PUMP"

MASTER GAUGES, 6"

There will be two-(2) 6" master gauges installed on the pump operator's panel. The intake and discharge gauges will be liquid filled with a solution to assure visual readings and reduce inner lens condensation. The face of the gauge will be white with black markings.

FILL SUBSURFACE / RETURN LINE

There will be one-(1) subsurface / return line installed in the booster tank. The subsurface / return line will prevent aeration of the water in the booster tank under low water conditions. The subsurface / return line piping will be of the same size as the "Tank Fill".

NFPA INDIVIDUAL GAUGE PACKAGE

The following monitoring devices will be installed on the pump operator's panel in compliance with the current NFPA standards.

- A 2" weatherproof oil pressure gauge
- 2" weatherproof engine coolant temperature gauge
- 3" tachometer indicating engine revolutions per minute
- 2" voltmeter that reads from 8 to 16 volts

There will be an audible alarm with warning indicator lights mounted behind the pump operator's panel that is connected to the oil pressure and water temperature gauges alerting the pump operator if low oil pressure or high-water temperature condition exists.

APPARATUS VALVES. WATEROUS / AKRON

The side discharge valves will be Waterous discharge valves. The chromium-plated bronze valve ball and bronze and stainless steel internal moving parts assure you of many years of dependable service. Ball bearings on the valve trunnions permit opening or closing the 3-1/2-inch valve easily, even under pressure. The 2-1/2-inch valves have upper and lower bronze bushings which support valve trunnions.

The Waterous valve design permits a single drain valve to drain both the valve body and discharge hose. This eliminates the expense of a separate valve drain and the nuisance of operating an extra control.

The hydraulically-balanced floating seal assembly is self-adjusting for wear, prevents leakage even under high pressure, and assures easy operation. Easily replaceable O-rings are used throughout. You never need to add or remove shims or make adjustments to correct for wear.

All other apparatus valves will be Akron heavy-duty swing out 8000 series brass body with flow optimizing stainless steel ball, and dual polymer seats. The valve will be capable of dual directional flow while incorporating a self-locking ball feature using an automatic friction lock design and specially designed flow optimizing stainless steel ball. The valve will not require the lubrication of seats or any other internal waterway parts, and be capable of swinging out of the waterway for maintenance by the removal of six bolts. The valve will a 10- year warranty covered by Akron Brass.

ENGINE SPEED COUNTER

An engine speed counter will be located on the pump panel to provide a means to certify the tachometer.

STEAMER INLETS. 6"

A 6" NST steamer inlet with removable screen and long handle cap will be provided on the left and right-side pump panels.

SUCTION CONTROL

The 6” left and right master pump suction inlets be individually controlled at the pump operator’s panel by an **electric operated Waterous Monarch valve with indicator lights** and built in relief valve mounting pad. A bleeder valve will also be provided with the valve package.

A warning plate permanently affixed in close proximity of the suction inlet will be installed stating:

"WARNING - SERIOUS INJURY OR DEATH COULD OCCUR IF INLET IS SUPPLIED BY A PRESSURIZED SOURCE WHEN THE VALVE IS CLOSED".

There will be a suction side relief valve provided for the front suction. The relief valve is adjustable from 50-250 psi and set at the factory at 125 psi. The discharge from the valve will be directed toward the ground and away from the pump operator

There will be a suction side relief valve provided in the pump system. The relief valve is adjustable from 50-250 psi and set at the factory at 125 psi. The discharge from the valve will be directed toward the ground and away from the pump operator

SUCTION INLET, FRONT

A 5" front suction inlet will be installed on the apparatus terminating with a chrome plated MNST adapter with strainer.

The front of the suction pipe will be designed to extend vertically 2" above the top surface of the gravelshield on the officer's side.

Two-(2) 3/4" ball valves will be provided for the front suction located at the lowest points of the plumbing and will be properly labeled. The valves shall have a cast bronze body, with a 1/4 turn, chrome plated bronze ball, reinforced Teflon seals, and blow-out-proof stem rated to 600 PSI.

SUCTION CONTROL, FRONT

The front suction inlet will be controlled at the pump operator’s panel by an **electric operated Waterous Monarch valve with indicator lights** and built in relief valve mounting pad. A bleeder valve will also be provided with the valve package.

A warning plate permanently affixed in close proximity of the suction inlet will be installed stating:

"WARNING - SERIOUS INJURY OR DEATH COULD OCCUR IF INLET IS SUPPLIED BY A PRESSURIZED SOURCE WHEN THE VALVE IS CLOSED".

There will be a suction side relief valve provided for the front suction. The relief valve is adjustable from 50-250 psi and set at the factory at 125 psi. The discharge from the valve will be directed toward the ground and away from the pump operator

PIPING, FRONT SUCTION

The front suction plumbing will be constructed from schedule 10 stainless steel piping with Victaulic couplings each end. The plumbing will be fitted routed along the chassis frame rails.

Plumbing painted job color red.

A 6" swivel elbow rotating 180 degrees will be installed in the front suction plumbing.

Swivel shall be painted job color red.

THERMAL RELIEF VALVE W/LIGHT

The pump will be equipped with a Waterous Overheat Protection Manager (OPM) device model 82516-1A. The valve is preset to open at 140 degrees Fahrenheit. The OPM warning light display will be provided on the preset panel and will be triggered when temperatures exceeds 180 degrees.

RELIEF VALVE, INTAKE

There will be a suction side relief valve provided in the pump system. The relief valve is adjustable from 50-250 psi and set at the factory at 125 psi. The discharge from the valve will be directed toward the ground and away from the pump operator.

Shall be Akron brand.

TANK TO PUMP

The booster tank will be connected to the intake side of the pump with a check valve. The 3" tank to pump line will run from a bottom sump into the 3" valve. To prevent damage due to chassis flexing or vibration, a short 3" flexible rubber hose coupling will be used to connect the tank to the intake valve.

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

The tank to pump valve will be a quarter turn fixed pivot design. The valve will be controlled by a chrome push/pull locking "T" handle installed at the pump operator's panel.

TANK FILL

A 1-1/2" tank fill line will be provided, using a quarter turn full flow ball valve and high-pressure flexible hose. The valve will be push-pull controlled from the pump operator's panel.

ENGINE COOLER

The engine cooler will be installed in-line from the discharge side of the pump, and installed in the engine cooling system. There will be a 1/2", quarter turn valve installed thru the pump panel and will be clearly labeled.

PUMP COOLER

The pump will have a 3/8" line installed from the pump discharge to the water tank to cool the pump during long periods of pumping when water is not being discharged. The pump cooler will be controlled from the pump operators panel by a 1/2" valve consisting of a cast bronze body with 1/4 turn chrome plated bronze ball, reinforced Teflon seals and blow-out-proof stem rated to 600 PSI.

The valve will be installed thru the pump panel and clearly labeled.

SPECIAL THREAD ADAPTER, 2-1/2" SUCTION INLETS

Each 2-1/2" suction inlet supplied with the apparatus will have special threads specified by the department with gray hardcoat caps and 2-1/2" MNH x 2-1/2"F special threaded adapters.

2-1/2" NY Corp (3.00 x 8 TPI)

Shall be Kocheck H51 gray hardcoat finish/ NO Chrome

SUCTION(S), 2-1/2" LEFT PANEL

One (1) 2-1/2" swing operated ball valve(s) will be installed on the left side pump panel plumbed to the suction side of the pump with 2-1/2" piping. The suction(s) will be equipped with a 2-1/2" FNST gray hardcoat inlet swivel, brass inlet strainer, gray hardcoat plug with chain and 3/4" drain valve. The control handle will be located at the valve.

A warning plate permanently affixed in close proximity of the suction inlet will be installed stating:

"WARNING - SERIOUS INJURY OR DEATH COULD OCCUR IF INLET IS SUPPLIED BY A PRESSURIZED SOURCE WHEN THE VALVE IS CLOSED".

Shall be Kocheck H51 gray hardcoat finish/ NO Chrome

SUCTION(S), 2-1/2" RIGHT PANEL

One (1) 2-1/2" swing operated ball valve(s) will be installed on the right-side pump panel plumbed to the suction side of the pump with 2-1/2" piping. The suction(s) will be equipped with a 2-1/2" FNST gray hardcoat inlet swivel, brass inlet strainer, gray hardcoat plug with chain and 3/4" drain valve. The control handle will be located at the valve.

A warning plate permanently affixed in close proximity of the suction inlet will be installed stating:

"WARNING - SERIOUS INJURY OR DEATH COULD OCCUR IF INLET IS SUPPLIED BY A PRESSURIZED SOURCE WHEN THE VALVE IS CLOSED".

Shall be Kocheck H51 gray hardcoat finish/ NO Chrome

DISCHARGE ELBOWS

All 2-1/2" side discharge outlets will terminate with 30-Degree elbows with 2-1/2" MNST threads and gray hardcoat vented caps/chains.

The caps will automatically release pressure in the discharge outlet before the threads are completely disengaged unless the outlet and the cap are equipped with drains or bleeder valves.

Shall be Kocheck H51 gray hardcoat finish/ NO Chrome

SPECIAL THREAD ADAPTERS, 2-1/2" DISCHARGES

Each 2-1/2" discharge supplied with the apparatus will have special threads specified by the department with gray hardcoat caps and 2-1/2" FNH x 2-1/2" M special threaded adapters.

All adaptors shall be Kochek H51 gray hardcoat finish / NO Chrome

2-1/2" threads shall be 2-1/2" NY Corp. (3.00 x 8 TPI)

DISCHARGE, FRONT BUMPER

There will be one-(1) front discharge installed thru the gravelshield, driver's side outboard of the frame rail.

The front bumper discharge will terminate with a 90-degree swivel elbow, 2-1/2" FNPT x 2-1/2" MNST. One-(1) 2-1/2" brass valve with 3/4" drain will be installed on the discharge side of the pump plumbed to the front swivel with flexible high-pressure hose and Victaulic stainless steel couplings tested to 1200 PSI. The front discharge will be a **Waterous handwheel control with indicator lights** controlled at the pump operator's panel.

A tread plate stop will be provided preventing the front bumper discharge swivel from incidental contact with the cab.

SPEEDLAY

One-(1) speedlay compartment designed as an integral part of the pump module, will be located forward of the pump just above the frame rails accommodating 200' 1 3/4" hoses and 600' of 2 1/2" hose. Stainless steel nylon guide rollers will be installed at each end with stainless steel scuff plates around the perimeter of the speedlay protecting the painted surfaces.

A safety sign FAMA22, which warns of the need to secure hose, will be visible to personnel at the hose storage area.

Total of one (1) dry speedlay. Delete all pump plumbing on all three speedlays; delete speedlay under cab, two speedlays

REMOVABLE SPEEDLAY HOSE TRAY

There will be one-(1) removable, speed lay hose tray provided with the apparatus constructed of 3/16" smooth aluminum with handles at each end held in place by horizontal bulkheads at each end of the compartments.

One (1) removable tray.

The cargo net end flaps will be secured using aircraft style seat belt straps. The seat belt male end will be hard fastened to the body with the female end attached to the end flaps. The cover prevents hose from inadvertently deploying during normal operations meeting the current NFPA requirements.

The end flaps will be black in color.

DISCHARGES, 2-1/2" LEFT SIDE (2)

There will be two-(2) discharge outlets with a 2-1/2" valve on the left side pump panel. The outlets will be hand wheel controlled from the operator's panel and terminate with 2-1/2" MNST threads.

Discharges shall include 2-1/2" F NYCorp x 1-1/2" MNST reducing adapters with 1-1/2" F NST caps and retainer chains

Handwheel control to be Waterous handwheel with indicator lights.

All adapters shall be Kocheck H51 gray hardcoat finish

DISCHARGE, 2-1/2" RIGHT SIDE

There will be one-(1) discharge outlet with a 2-1/2" valve on the right-side pump panel. The outlet will be hand wheel controlled from the operator's panel and terminate with 2-1/2" MNST threads.

Discharge shall include 2-1/2" F NYCorp x 1-1/2" MNST reducing adapter with 1-1/2" F NST cap and retainer chain

Handwheel control to be Waterous handwheel with indicator lights.

All adapters shall be Kocheck H51 gray hardcoat finish

DISCHARGE, 4" RIGHT SIDE

There will be one-(1) discharge outlet with a 4" valve on the right-side pump panel. The outlet will be hand wheel controlled from the operator's panel and terminate with 4" MNST threads.

Handwheel control to be Waterous handwheel with indicator lights

The discharge shall include a 4" NST x 5" Storz elbow adaptor with cap and chain.

All adaptors shall be KOCHECK H51 gray hardcoat finish. Handwheel with indicator lights.

DECK GUN PLUMBING, 3"

A 3" deck pipe will be installed above the pump in such a manner that a monitor can be mounted and used effectively. The piping will be installed securely so no movement develops when the line is charged. The piping will terminate with 3" NPT threads and a 4-bolt flange for mounting a monitor. The 3" valve will be electrically controlled from the operator's panel.

Valve shall be handwheel controlled. Handwheel control to be Waterous handwheel with indicator lights

TELESCOPING MONITOR PIPE 18"

A Task Force Tips model XG**VL-PL manually telescoping waterway will be installed. The waterway will be capable of being lowered to deck level (or into a monitor well) for storage and transportation and will be capable of being raised to an extended height by lifting a quick release latch located at the top of the

extension tube. This latching device will be capable of locking the waterway in the raised position while maintaining the ability to horizontally rotate the monitor device 360 degrees.

A sensor will be located on the waterway that signals a 12-volt indicator light installed in the cab to illuminate to indicate that the monitor is raised when the park brake is released.

The aluminum riser will have a 3" waterway; hardcoat anodized finish and be furnished with a 3" Victaulic inlet and a 3" male NPT outlet. The unit will be covered by a five-year warranty.

DECK GUN MONITOR

There shall be one (1) Akron Apollo single inlet waterway monitor with tiller bar control. The monitor shall be supplied with Akron triple stacked tips and an Akron discharge pipe. In addition, an Akron variable stream nozzle will be supplied.

Final details to be discussed at the pre-construction conference.

WATER TANK, 500 GALLONS

The tank will have a capacity of 500 U.S. gallons and will be constructed of polypropylene plastic. This material will be a non-corrosive stress relieved thermoplastic and UV stabilized for maximum protection.

The tank will be baffled in accordance with NFPA Bulletin 1900 requirements.

The baffles will have vent openings at both the top and bottom to permit movement of air and water between compartments.

A sump that will be sized dependent on the tank to pump plumbing will be provided at the bottom of the water tank. The sump will include a drain plug and the tank outlet.

The tank will have a combination vent and manual fill tower. The fill tower will be constructed of polypropylene and will be a minimum dimension of 8" x 8" outer perimeter. An overflow pipe, constructed of 4.00" schedule 40 polypropylene, will be installed approximately halfway down the fill tower and extend through the water tank and exit to the rear of the rear axle.

WATER TANK SIZE CERTIFICATION

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

GAUGES, WATER LEVEL – LEFT AND RIGHT-SIDE PUMP PANELS

A Fire Research TankVision Pro model WLA300-A00 tank indicator kit will be installed on the pump operator's panel. The kit will include an electronic indicator module, a pressure sensor, and a 10' sensor cable. The indicator will show the volume of water in the tank on nine (9) easy to see super bright RGB LEDs. A wide view lens over the LEDs will provide for a viewing angle of 180 degrees. The indicator case will be waterproof, manufactured of Polycarbonate/Nylon material, and have a distinctive blue label.

The program features will be accessed from the front of the indicator module. The program will support self-diagnostics capabilities, self-calibration, six (6) programmable colored light patterns to display tank

volume, adjustable brightness control levels and a datalink to connect remote indicators. Low water warnings will include flashing LEDs at 1/4 tank, down chasing LEDs when the tank is almost empty, and an output for an audio alarm.

The gauges shall be located one (1) on the left -hand pump panel and one (1) on the right-hand pump panel.

APPARATUS BODY, 103" WIDE

The 103" wide apparatus body and sub frame will be constructed entirely of marine grade aluminum plate and extrusions.

BODY SUBFRAME

The main body support cross member extrusions will be 3" x 4" 6061T6 aluminum alloy, double "I" beam with a wall thickness of 7/16" (.438"). These cross members will extend the full width of the body to support the compartment framing. The cross members will be welded to a 3/4" (.750") x 3" solid aluminum, 6061T6 aluminum (alloy frame rail) extrusion. The frame rail extrusion will be shaped in contour with the chassis frame rails. The frame rail extrusion will be mounted over a 1/2" (.5") thickness, reinforced rubber cushion to isolate the aluminum sub frame from the chassis steel frame rails. The apparatus body structure will be securely fastened to the chassis frame rails with a minimum of six-(6) 5/8" (.625") cross member OD, steel U-bolts. The main body support cross member will have a gusset above and below each cross member. The gussets will be constructed of 2.0" x 4.0" 6063T6 aluminum alloy extrusion with a .190" wall thickness. The gussets will be continuously welded with 5356 aluminum alloy welding wire to add support to the body sidewalls. The main body supports and the longitudinal double "I" beam supports will have a "C" shaped rubber tank cushion installed on the top of each member. This rubber extrusion will conform to the shape of the double "I" beam extrusion to keep the tank cushion in place. This method is used to prevent damage to the tank.

Absolutely no pop-rivets, screws or any other hardware will be used to hold the rubber tank cushion in place.

BODY CONSTRUCTION

The complete apparatus body structure will be an all-welded construction and be free from nuts, bolts and other fasteners. Upon completion of the weldments, the body will be completely sanded and deburred for removal of all sharp edges.

The body framework will be formed from beveled aluminum alloy extrusions and electrically seam welded at each joint using 5356 aluminum alloy welding wire. Body sides will be formed from 5052 H-32 (marine grade) smooth aluminum plates. The horizontal surfaces above the compartment tops will be constructed from aluminum tread plate.

The horizontal and vertical frame member extrusions will be 2.0" x 4.0" with a .190" wall thickness. The extrusion will be made from 6063T6 aluminum alloy. This extrusion will have .190" outside radius corners. The longitudinal frame member, below the lower compartments will be a 2.0" x 4.0" 6063T6 aluminum alloy extrusion with .190" radius corners. Each body corner will be a 3.5" x 9-3/4" 6063T6 extruded aluminum section with .210" wall thickness, and will be welded as an integral part of the body. This extrusion will have a 1" corner radius.

COMPARTMENT CONSTRUCTION

The compartment sidewalls will be of one-piece construction. The walls will be formed from 3/16" (.1875") 5052 H-32 (marine grade) smooth aluminum plate. All compartment floors will be formed from 3/16" (.1875") aluminum tread plate. The floors will be welded in place with a continuous weld all around the perimeter to insure maximum strength.

The external compartment tops will be constructed of 1/8" (.125") aluminum tread plate. The tops will have a formed edge, which serves as a drip rail for the compartments below. The compartment tops will be secured with stainless steel screws to allow for ease of removal for access to the bodies wiring harnesses.

The compartment seams will be sealed with permanent pliable silicone caulking.

Each compartment will be vented through a 3" wide x 15" high louver that is machined stamped in a panel located in each body corner extrusion. The panel will be removable to provide access to service wiring and other mounted components.

Due to the ladder storage area and sweep out floors, the running board compartments of this style vehicle are of a split height, split depth, full width configuration. The referenced compartment sizes approximate the extreme outside compartment dimensions without deductions for the floor material thicknesses, flanges or ladder storage compartment headers. To assure proper vehicle weight distribution, the compartment dimensions may change in width with the final body shift and wheelbase.
103" wide

WHEEL WELL PANELS, PAINTED ALUMINUM

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

Wheel liners shall be trimmed so that snow chains will not catch on them.

FENDERETTES, BLACK RUBBER

The body fenderettes will be black rubber securely fastened to the body wheel wells on each side.

HOSEBED

The hose bed sides will be constructed of 3/16" (.1875") 5052 H-32 (marine grade) smooth aluminum plate welded to the extruded framework. There will be a 3" x 3.5" 6063T6 aluminum extrusion with .190" wall thickness running the entire length of the hose bed at the top for structural rigidity. The hose bed decking will be constructed from anodized aluminum extrusions. The extrusions will be 3/4" (.750") x 8.125" and have 3/4" (.750") x 3.00" hat channel attached to the underside to form a one-piece grid. The entire deck will be removable, in one piece, to allow ease of serviceability to the tank. The hose bed will include an extrusion across the front and rear of the compartment for the installation of adjustable hose bed dividers.

The fire apparatus hose bed will be 44" wide.

A safety sign FAMA22, which warns of the need to secure hose, will be visible to personnel at the hose storage area.

See hose load layout.

COMPARTMENTS, LEFT SIDE

L1

There shall be one-(1) compartment installed under the lower 2-1/2" speedlay. The interior compartment dimensions will be approximately 9-1/2" wide x 17-1/2" high x UREA TANK.

L2

There shall be one-(1) compartment installed above the 1-3/4" upper speedlay. The interior compartment dimensions will be approximately 9-1/2" wide x 44-1/2" high x 24" deep in the lower section and 85-1/2" deep in the upper section to shall accommodate a stokes basket or other long equipment.

L3

There shall be one-(1) compartment installed at the front of the body, containing the left side pump panel. The interior compartment dimensions will be approximately 42-1/2" wide x 70" high x PUMP PANEL. In the upper front area, there shall be a transverse module for three (3) fire department supplied backboards.

L4

There shall be one-(1) compartment installed ahead of the rear axle. The interior compartment dimensions will be approximately 36" wide x 70" high x 27-1/2" deep.

L5

There shall be one-(1) compartment installed above the wheel well. The interior compartment dimensions will be approximately 58" wide x 34" high x 27-1/2" deep.

L6

There shall be one-(1) compartment installed behind the rear axle. The interior compartment dimensions will be approximately 50" wide x 66" high x 27-1/2" deep.

COMPARTMENTS, RIGHT SIDE

R1

There shall be one-(1) compartment installed under the lower 2-1/2" speedlay. The interior compartment dimensions will be approximately 9-1/2" wide x 17-1/2" high x 21" deep.

R2

There shall be one-(1) compartment installed above the 1-3/4" upper speedlay. The interior compartment dimensions will be approximately 9-1/2" wide x 44-1/2" high x 27-1/2" deep in the lower section and 15" deep in the upper section.

R3

There shall be one-(1) compartment installed at the front of the body, containing the left side pump panel. The interior compartment dimensions will be approximately 42-1/2" wide x 70" high x PUMP PANEL in the lower section and 27-1/2" deep in the upper.

R4

There shall be one-(1) compartment installed ahead of the rear axle. The interior compartment dimensions will be approximately 36" wide x 70" high x 27-1/2" deep.

R5

There shall be one-(1) compartment installed above the wheel well. The interior compartment dimensions will be approximately 58" wide x 34" high x 27-1/2" deep.

R6

There shall be one-(1) compartment installed behind the rear axle. The interior compartment dimensions will be approximately 50" wide x 66" high x 27-1/2" deep.

COMPARTMENT, CENTER REAR

B1

There shall be one-(1) compartment installed at the center rear of the apparatus. The compartment shall have a useable door opening of approximately 44" wide x 28" high and be approximately 22" deep.

COMPARTMENT DOOR(S), HINGED

The specified compartments will have doors constructed entirely from 5052-H32 smooth aluminum plate using a box pan configuration. The outer panel will be constructed from 3/16" (.1875") smooth aluminum plate and the inner pan stitch welded in place from 1/8" (.125") smooth aluminum plate.

There will be a 1/4" (.250") hole installed in the lower corners of the inside door pans for drainage. The doors will have a closed cell neoprene rubber gasket installed around the perimeter of the door to remove water.

Exterior door latches will incorporate a polished D-paddle handle with rotary style latch. For ease of operation, the D-handle opening will be large enough to accommodate a gloved hand. The D-paddle latching design will be subjected to corrosion, water infiltration, and cycle testing to 35,000 cycles. Double doors will utilize concealed rotary latches on the secondary door, actuated by a recessed stainless steel paddle handle. The door design will not impede into the compartment opening when in the open position. The watertight door seal will exceed the current KKK-1822 water infiltration standards. The doors will be securely fastened to the apparatus body with full-length stainless steel piano hinges using 1/4-20 stainless bolts and locking nuts. The hinges will be slotted to allow for adjustments.

Absolutely no self-tapping screws or pop rivets will be acceptable to mount the door mechanisms or slam latch assemblies.

Compartments L1/R1, L2/R2 shall have single vertically hinged doors.

Compartments L3/R3 shall have no door.

Compartments L4/R4, L5/R5, L6/R6 and B1 shall have double vertically hinged doors.

PADDLE LATCH DOOR EXTENSION(S)

There will be a paddle latch door extension(s) installed on the secondary door of the specified body compartment(s).

Located on double door compartments **L4/R4, L5/R5, L6/R6 and B1**

REAR BODY CONSTRUCTION. FLAT BACK DESIGN

The rear of the apparatus will be flat back design. No beavertails will be installed on the unit.

COMPARTMENTS. ROOF TOP STORAGE

Four-(4) roof top compartments will be installed, two-(2) each side of the upper body. The compartments will be constructed from same material as the body and will be integral with the body. Each compartment will have a door constructed from aluminum tread plate. The doors will have a stainless-steel piano type hinge and chest style latch. The interior compartment dimensions will be determined by customer requirements for equipment storage and engineering. Compartments will have a 1/2" flange around the opening to prevent water from entering the compartment when the door is closed. The doors will be held open with gas shocks.

Each compartment will have a grommet mount LED installed to the compartment inner door pan that activates when the door is open.

TL1: 95-1/2" long x 23" wide x 30-1/2" deep or deeper if possible

TL2: 95-1/2" long x 23" wide x 30-1/2" deep or deeper if possible

TR1: 83-1/2" long x 23" wide x 30-1/2" deep or deeper if possible

TR2: 83-1/2" long x 23" wide x 30-1/2" deep or deeper if possible

Each compartment shall be equipped with a drain tube that exits below the body

COMPARTMENT. LADDER STORAGE

There will be a ladder compartment installed in the hose bed on the right side of the apparatus. The compartment will be fabricated from aluminum tread plate. Individual equipment compartments will house one-(1) 24' extension ladder, one-(1) 14' roof ladder, one-(1) 10' attic ladder and specified pike poles. The floor of the compartment will be lined to aid in both loading and unloading of the equipment. The compartment will have a hinged aluminum tread plate door with latch mechanism. The door will be installed using a stainless-steel piano hinge and attached with stainless steel nuts and bolts. Absolutely no self-tapping screws or pop rivets will be acceptable.

STORAGE TUBES. PIKE POLE / ROOF HOOK

Two-(2) aluminum tubes will be installed on the apparatus for pike pole / roof hook storage.

The tubes shall be located in the ladder compartment the length as lang as possible.

There shall be an aluminum module located in the upper front corners of the L3/R3 pump panel compartments. The module shall create a transverse area for the storage of 1 backboard and stokes type basket. Items shall be held in place on each end by retaining straps.

AIR BOTTLE COMPARTMENT(S). BODY WHEEL WELL

There will be **THREE-(3) air** bottle compartment(s) located in the body wheel well to house three-(3) spare SCOTT 5.5 45 MIN SCBA cylinders. The compartment will be lined to provide scuff protection to

the equipment. The bottom of the compartment will be supported to eliminate breakage. The compartment will be vented to facilitate moisture drainage.

Locations will be left front, right front and right rear.

EXTINGUISHER COMPARTMENT(S). BODY WHEEL WELL

There will be one (1) extinguisher compartment(s) located in the body wheel well to house two-(2) extinguishers (2-1/2-gallon water and 20-pound ABC). The compartment will be lined to provide scuff protection to the equipment. The bottom of the compartment will be supported to eliminate breakage. The compartment will be vented to facilitate moisture drainage.

Location will be left rear.

DOORS. WHEEL WELL COMPARTMENTS

The wheel well compartment doors will be painted aluminum with a push button trigger latch.

BODY TRIM

The standard body trim will include the following:

There will be drip rail installed over the compartment door openings.

A drip rail will be located over each compartment door. This drip rail will form a lip over the exterior door pans to prevent water from running into a compartment.

The vertical rear face of the body will be covered with smooth aluminum plate.

There will be one-(1) handrail installed at the left of the apparatus. The handrail will be constructed from 1-1/4" knurled stainless steel. The handrail will be mounted with chrome plated end stanchions.

The handrail will be sufficient in length to meet all standard requirements.

The handrail will meet or exceed NFPA 1900 requirements.

No rear stanchions will be provided on this unit.

FUEL FILL. RECESSED WITH DOOR

There will be a recessed fuel fill assembly with a non-locking door mounted on the left side of the apparatus body. The fuel fill assembly will be equipped with a fuel fill cap, retention ring and hinged door. The assembly will be properly labeled "DIESEL FUEL ONLY".

MUD FLAPS. REAR

The rear axle mud flaps will be constructed from hard black rubber and installed at the rear of the body fenders.

REAR MUD FLAP, FULL WIDTH

An additional full width mud guard will be installed behind the standard rear mud flaps. The full width guard will be 1" from the ground.

BODY RUBRAIL

All lower compartments will have a poly rub rail assembly above and below them that is bolted and spaced from the lower body. The rub rail will be 2-1/2" high x 1" solid polypropylene spaced 1/2" away from the body with 1-1/2" diameter black plastic bushings for each rub rail.

The attachment of the rub rails to the body will be made with recessed 1/2" stainless steel bolts with back up washer.

The assembly will have 45-degree angles at each end of assembly.

The solid rub rail will serve as protection to the side doors when coming into contact with close objects.

An additional full length rub rail shall be installed at the roof level on each side.

REAR STEP

The rear step will be constructed of 3/16" (.1875") aluminum tread plate. The rear step will be flanged down 2.50" and in 1.00" to maximize strength and rigidity. The rear step will be bolted on for removal or replacement.

All running board and step surfaces will comply with NFPA 1900.

12" REAR STEP

The rear step will be 12" in length.

The end corners shall be angled at 45 degrees.

GRIP STRUTS INSERTS

Grip strut inserts will be installed in the aluminum tread plate running boards and tailboard. The grip strut will be designed to reduce slippage in wet or icy conditions.

ACCESS LADDER, REAR MOUNTED

A rear mounted access ladder will be provided on the rear of the unit to facilitate access to the top portion of the apparatus. The ladder will be constructed from stainless Steel tubing and mounted as directed by the department.

All step surfaces will comply with NFPA 1900.

LIGHT(S), LED PERIMETER ILLUMINATION

Four (4) LED perimeter illumination light(s) will be provided. The steady burn illumination light will incorporate clear LED and a clear non-optic hard coated polycarbonate lens for maximum output.

Three-(3) lights will be located on the rear of the apparatus to illuminate the access ladder and one-(1) in the upper landing area.

The lights will automatically illuminate when the park brake is set.

STEP SLIDE OUT

One (1) slide-out step(s) will be installed under the apparatus as specified constructed from 3/16" (.1875) aluminum tread plate. Two-(2) sealed roller bearing slides, with a total capacity of 500-pounds will be installed one-(1) each side of the platform mechanically held in both the retracted and extended positions with a rugged quick-action latch. The steps will be wired to the open-door indicator system activating the light in the cab when the step is in the extended position.

Located at the rear of the apparatus, centered under rear hosebed. Step surface shall have Grip Strut inserts.

TOW EYES, REAR

Two-(2) 1" thick rear tow eyes constructed of A-36 steel will be mounted below the frame at the rear of the vehicle. The tow eyes will be attached to steel weldments that are mounted to the apparatus. The eyes will have a minimum dimension of three-(3) inches. The tow eyes will be used for towing, not lifting the vehicle.

Tow eyes shall be painted job color red.

HANDRAIL, BELOW HOSE BED

There will be one-(1) handrail installed below the hose bed. The handrail will be constructed from 1-1/4" knurled stainless steel. The handrail will be mounted with chrome plated end stanchions.

The handrail will meet or exceed NFPA 1900 requirements.

HOSE BED DIVIDER(S)

Two (2) hose bed divider(s) will be manufactured from 1/4" (.250") smooth aluminum plate with an extruded aluminum base welded to the bottom. The divider will have an extruded track to slide in to allow the hose bed to adjust for different hose capacities.

Aluminum tubing will be welded to top and rear edges of divider forming a continuous border. The tubing will be formed in a manner that provides a grab handle at the rear of divider.

An additional unistrut shall be mounted on front wall of hosebed for additional hosebed divider support.

HOSE BED CAPACITY

The hose bed shall have the capacity to hold the following:

- 600 feet of 2-1/2" hose
- 600 feet of 2-1/2" hose w/ 200 feet of 1-3/4" hose on top
- 1000 feet of 5" hose

HOSE BED COVER

A hose bed cover constructed of 16 oz. heavy-duty Hypalon will be provided. Cover will be fire retardant and installed over hose bed. The cover will have chrome twist-locks and Velcro installed around the perimeter of the hose bed. The end of the hose bed cover will be secured and cover the hose bed opening. The cover will completely protect the hose in the hose bed and prevent hose from inadvertently deploying during normal operation.

A safety sign FAMA22, which warns of the need to secure hose, will be visible to personnel at the hose storage area.

The Hypalon end flap will be secured at the bottom. The cover prevents hose from inadvertently deploying during normal operations meeting the current NFPA requirements.

The cover will meet the NFPA 1900 15.10.5 requirement.

The cover and/or end flaps will be red in color.

THE COVERS HAVE VELCRO AND BUNGEE CORDS securing method; no push pin or button style allowed.

SHELE PERMANENT

There will be two (2) permanent shelves constructed from aluminum installed on the apparatus. Each will have a 2" lip at the front and rear for additional strength.

Depth of trays are for radio chargers, one (1) mounted on the upper front wall of compartment L4 and one (1) on the upper rear wall of compartment R4.

COMPARTMENT UNISTRUTS

Seven (7) set(s) of aluminum unistruts will be installed in the compartment(s) specified by the department for future installation of shelves or to allow the specified trays/tool boards to be adjustable.

Unistrut shall be low profile design and located in the following compartments - L4, L5, L6, R4, R5, R6 and B1

SHELE ADJUSTABLE

There will be nine (9) 25-28" deep adjustable shelves constructed from 3/16" brushed finish aluminum. Each shelf shall have the front edge broken to a double channel edge reinforcement with 2" vertical beam. The rear edge shall have a similar break, but in the opposite direction so that shelf may be reversed for a lip free edge.

Adjustable shelves shall be located as follows - L4, L5, L6, R4, R5, (3) in R6, B1

TRAY(S). 500 POUND ROLL OUT

There will be four (4) 24-28" deep roll-out tray(s) constructed from 3/16" (.1875") smooth aluminum plate installed on the apparatus. The tray(s) will have a 3" lip on all sides for additional strength. The

tray(s) will be mounted on Slide Master slides with a combined capacity of 600-pounds. The tray and the rail system extend 70% out of the compartment.

Slide out trays shall be floor mounted in the following compartments R6 L6 R4 L4

COMPARTMENT FLOORING. MODULAR TILE

There will be modular tile installed on the compartment floor(s). The flooring tile will be completely removable for cleaning.

If the compartment has a roll out tray mounted directly on the floor, the tile will be mounted in the tray.

Compartment floor tile as follows - L1, L2, L5, R1, R2, R5, B1

Color = BLACK

SHELF / TRAY FLOORING. MODULAR TILE

There will be modular Tile flooring installed in the specified shelf or tray. The tile will be completely removable for cleaning.

Located on the nine (9) adjustable shelves and four (4) roll-out trays

Color = BLACK

POLY TOOLBOX WITH HINGED TOP

There will be one (1) polypropylene toolbox supplied with the apparatus.

The toolbox will have a hinged top to allow for bags of speedy dry dumped into it and then closed. A ¼ turn latch lock will be installed.

Located on the floor mounted slide tray in compartment L6. The box shall be large enough to hold six (6) bags of speed dry. Bottom of box to have a guillotine type valve/discharge for speedy dry to flow through.

ELECTRICAL SYSTEM. BODY

The body electrical system will be designed as an integrated electrical package specifically engineered for fire apparatus application. The integrated electrical system will interface the body and chassis through an engineered system.

All body electrical equipment installed will conform to current automotive electrical system standard, the latest Federal DOT standards, and the requirements of the applicable NFPA Apparatus Standard. Twisted pair shielded wire will be provided within the electrical system for noise reduction.

The wiring harness will conform to SAE J-1128 with GXL temperature properties. All exposed wiring will be run in loom with a minimum 289 °F rating. All wiring looms will be properly supported and attached to body members along the entire run. All wiring will be mounted as to provide protection from water and heat. All connections will be crimp type with heat shrink tubing with insulated shanks to resist moisture and foreign debris such as grease and road grime. Weather resistant connectors will be provided throughout to ensure the integrity of the electrical system. Gold contacts will be used where required for

superior connectivity and improved performance. All wiring looms will be properly supported and attached along the entire run. At any point where wire or looms must pass through metal, rubber grommets will be installed to protect the wire from abrasion.

Wiring will be individually and permanently numbered, function and color-coded using an indexing numbering system in which all circuits are categorized by function and will be permanently marked every three (3) inches on the insulation to allow for easy identification.

All internal wire end terminals, including locking bulkhead connectors, will be mechanically affixed to the wire ends by machine terminal crimping presses. No hand-crimped terminals will be acceptable.

All internal splices will be ultrasonically welded connections - no butt style connections will be acceptable. All internal wiring will be of the high temperature GXL type wire and will be protected by wiring duct wherever possible.

The body will have an in-vehicle networking system, to provide real time or current state diagnostic capability and reduce troubleshooting or down time.

An electrical harness quick disconnect will be provided to facilitate removal of the body in the future. All circuit protection will be integral of control modules. There will not be automatic reset circuit breakers located in the body main harnessing and distribution system.

The system will have the capability of delivering multiple signals via a data bus, utilizing specifications set forth by SAE J1939.

The body includes strategically located solid-state modules within the body. The modules are for the body lighting and controls.

The system will consist of all solid-state components contained inside sealed aluminum extrusions and/or weatherproof Deutsch enclosures referred to as nodes. The system will also incorporate, as needed, miniature nodes. The nodes will not have special mounting requirements.

The system, at a minimum, will be capable of performing the following functions:

- Load management and sequencing
- Switch loads
- Receive digital and analog signals
- Perform and report diagnostics
- Continuously report vehicle status
- System is expandable
- Power distribution outputs
- Switch input capability
- Solid state circuitry
- Self-contained LED diagnostic indicators
- PWR for input power status (red)
- COM for communication status (green)
- The complete body electrical system will be 100% documented and contain independent circuit diagrams with point-to-point wiring information, as well as a general component diagram be included in the apparatus manual.

WIRING PROTECTION

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

LIGHT(S). LED COMPARTMENT

There will be twenty (20) LED compartment strip lights installed on the apparatus.

Lights shall be OnScene Access Series LED tube lights.

Two (2) per compartment. (12) side body compts, B1, (4) roof compts, (2) crew cab exterior compts

Compartments L3 and R3 compartment lighting shall be activated by OK to Pump circuit.

Additional OnScene tube light shall be mounted across the front of the hosebed area.

The light shall be activated by the park brake.

12-VOLT TESTING

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

Reserve Capacity Test

The unit will be run until all engines, engine compartment temperatures are stabilized and the battery system is fully charged. The engine will be shut off and the minimum continuous electrical load be activated for ten-(10) minutes. All electrical loads will be shutoff after ten-(10) minutes and the battery system will then be capable of restarting the engine.

Alternator Performance Test at Idle

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

Alternator Performance Test at Full Load

The total continuous electrical load will be activated with the engine running up to the manufacturer's governed speed. The test duration will be a minimum of two-(2) hours. Activation of the load management system will be permitted during the test. If, however, an alarm is sounded by excessive battery discharge as detected by the system or a system voltage of less than 11.8 volts DC for a 12-volt nominal system for more than 120 seconds, will be considered a test failure.

Low Voltage Alarm Test

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

Battery Charger Test

If the apparatus is equipped with a battery charger it will be function tested as part of the 12-volt electrical system certification testing. The test will consist of charger output under load while maintaining battery voltage for 1 hour.

*Charge batteries to at least 12.66V (12V nominal system)

*Turn off engine / disconnect shoreline

*Connect ammeter to each charger output connection

- *Connect system to shoreline to energize charger
- *Turn on or add electrical loads until the charger output is between 80-100% of the rated output for that connection
- *Record battery voltage and output current at the beginning and every 20 minutes for 60 minutes total time
- *Charger / conditioner must maintain output voltage at least 12.54V (12V nominal system) and maintain at least 80% of rated output current

EMI/RFI PROTECTION

The apparatus will be manufactured to incorporate the latest designs in the electrical system with components that are state of the art to ensure electromagnetic interference (EMI) and radio frequency interference (RFI) emissions are suppressed at the source.

The apparatus will have the ability to operate in typical fire and rescue situations with no adverse effects from EMI and/or RFI.

The apparatus will utilize components that are fully protected and wiring that utilizes shielding and loop backgrounds where required to control EMI/RFI susceptibility. The apparatus will be bonded through ground straps. Relays and solenoids that are suspect to generating spurious electromagnetic radiation are diode and/or resistor protected to prevent transient voltage spikes.

In order to prevent the radio frequency interference completely the purchaser will 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.

GUARD(S). COMPARTMENT LIGHT

There will be one (1) guard provided to protect the specified compartment light(s). The guards will be fabricated from stainless steel.

Mounted on the hosebed LED tube lighting.

DOOR AJAR SWITCHES

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

LIGHTBAR. 72" WHELEN FREEDOM IV

There will be a Whelen Freedom IV 72" LED light bar installed on the cab roof as far forward as possible. The light bar will incorporate an anodized extruded heavy duty aluminum base and cover chassis with two-(2) front red corner modules with two-(2) red end cap modules, two-(2) interior white modules and ten-(10) interior red modules.

The light will be activated by the emergency light switch and individual light bar switch located in the cab dash.

The light bar will meet NFPA 1900 edition as configured.

LIGHTS. ZONE B/D UPPER FRONT BODY

Two-(2) Whelen M9 Series Super-LED model M9R will be installed, one-(1) each side of the upper front corner of the body. The warning light will incorporate red Super-LEDs, a red non-optic hard coated polycarbonate lens, clear optic collimator and utilize a metalized reflector for maximum output. The hard coated lens will provide extended life/luster protection against UV and chemical stresses. The encapsulated lens/reflector assembly and conformal coated PC board will provide additional protection against environmental elements. The solid-state warning lights will be vibration resistant. The self-contained flashing light will have 164 Scan-Lock flash patterns including synchronize feature and steady burn. The warning light is covered by a five-year factory warranty. The surface mount module includes a M9FC chrome flange and hardware for horizontal mounting.

LIGHTS. ZONE B/D UPPER REAR BODY

Two-(2) Whelen M9 Series Super-LED model M9R will be installed, one-(1) each side of the upper rear corner of the body. The warning light will incorporate red Super-LEDs, a red non-optic hard coated polycarbonate lens, clear optic collimator and utilize a metalized reflector for maximum output. The hard coated lens will provide extended life/luster protection against UV and chemical stresses. The encapsulated lens/reflector assembly and conformal coated PC board will provide additional protection against environmental elements. The solid-state warning lights will be vibration resistant. The self-contained flashing light will have 164 Scan-Lock flash patterns including synchronize feature and steady burn. The warning light is covered by a five-year factory warranty. The surface mount module includes a M9FC chrome flange and hardware for horizontal mounting.

LIGHTS. ZONE C UPPER OUTBOARD

Two-(2) Whelen M9 Series Super-LED model M9R will be installed, one-(1) each side on the upper rear of the apparatus in the outboard position. The warning light will incorporate red Super-LEDs, a red non-optic hard coated polycarbonate lens, clear optic collimator and utilize a metalized reflector for maximum output. The hard coated lens will provide extended life/luster protection against UV and chemical stresses. The encapsulated lens/reflector assembly and conformal coated PC board will provide additional protection against environmental elements. The solid-state warning lights will be vibration resistant. The self-contained flashing light will have 164 Scan-Lock flash patterns including synchronize feature and steady burn. The warning light is covered by a five-year factory warranty. The surface mount module includes a M9FC chrome flange and hardware for horizontal mounting.

LIGHTS. ZONE B/D FRONT LOWER

Two-(2) Whelen M6 Series Super-LED model M6R lights will be installed, one-(1) each side forward portion of the apparatus. The warning light will incorporate red Super-LEDs, a red non-optic hard coated polycarbonate lens, clear optic collimator and utilize a metalized reflector for maximum output. The hard coated lens will provide extended life/luster protection against UV and chemical stresses. The encapsulated lens/reflector assembly and conformal coated PC board will provide additional protection against environmental elements. The solid-state warning lights will be vibration resistant. The self-contained flashing light will have 164 Scan-Lock flash patterns including synchronize feature and steady burn. The warning light is covered by a five-year factory warranty. The surface mount module includes a M6FC chrome flange and hardware for horizontal mounting.

Recess mounted in each end of the front bumper.

LIGHTS. ZONE B/D MIDSHIP LOWER

Two-(2) Whelen M6 Series Super-LED model M6V2R will be installed, one-(1) each side midship of the apparatus. The Whelen M6 Series Model M6V2R combination 180° warning/perimeter light will be provided. The M6V2R will incorporate Linear Super-LED® and Smart LED® technology. The configuration of the M6V2R will be a M6 V-series red warning light and a perimeter light with a split red/clear non-optic polycarbonate lens. The warning light will consist of two V-series PC boards containing six red Super-LEDs on each PC board. Clear optic collimators and reflectors will be installed with each PC board for maximum illumination. The perimeter light will consist of six white Super-LEDs installed on the scene light PC board. The perimeter light will be installed at 45° angle with a TIR reflector for supreme radiance. The warning light assembly and the perimeter light assembly are installed on a main PC board.

The warning light will include an internal flasher with 25 Scan-Lock flash patterns including low power and steady burn. The M6V2R will also be provided with a synchronize feature. The M6V2R warning light will meet KKK 1822F, NFPA 1900, and NFPA 1917 specifications. The M6V2R perimeter light will meet AMD 024 with two M6V2R on each side of the vehicle and NFPA 13.10.1.2 for one M6V2R up to six feet.

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

The M6V2R will be furnished with 12" unterminated pigtailed. Rubber gasket, screws, and screw grommets will be included for installation. The M6V2R, with the aid of two screws, will have the ability to be installed as a surface mount light. The warning light is covered by a five-year factory warranty.

One (1) pair M6R warning lights, over front wheel well

One (1) pair M6V2R warning/scene, over rear wheel well

LIGHTS. ZONE B/D REAR LOWER

Two-(2) Whelen ION Series Super-LED model WIONSMCR lights will be installed, one-(1) each side rearward portion of the apparatus. The warning light will incorporate six red Super-LED, a clear horizontal optic hard coated polycarbonate lens, clear optic collimator and utilize a metalized reflector for maximum output. The hard coated lens will provide extended life/luster protection against UV and chemical stresses.

The encapsulated lens/reflector assembly and conformal coated PC board will provide additional protection against environmental elements. The solid-state warning lights will be vibration resistant. The self-contained flashing light will have 25 Scan-Lock flash patterns including synchronize feature and steady burn. The warning light is covered by a five-year factory warranty. The surface mount module includes a standard single chrome plated flange and hardware for vertical or horizontal mounting.

Recess mounted in the rub rail below L3 and R3

LIGHTS. ZONE C LOWER

Two-(2) Whelen 600 Series Super-LED model 60A02FAA will be installed, one-(1) each side on the lower rear of the apparatus. The warning light will incorporate red Super-LEDs, a red non-optic hard coated polycarbonate lens, clear optic collimator and utilize a metalized reflector for maximum output. The hard coated lens will provide extended life/luster protection against UV and chemical stresses. The encapsulated lens/reflector assembly and conformal coated PC board will provide additional protection against environmental elements. The solid-state warning lights will be vibration resistant. The self-contained flashing light will have 164 Scan-Lock flash patterns including synchronize feature and steady burn. The warning light is covered by a five-year factory warranty.

Shall be (1) red and (1) blue. Blue shall be on the left (driver's) side rear of the apparatus

STOP, TURN AND BACK-UP LIGHTS

-Stop, turn and backup lights shall be Whelen 600 Series, individual fixtures. The red stop (LED) light shall be model 60R00BRR, the turn light shall be a model 60A00TAR amber (LED) type with directional arrow, and the backup light shall be a white (LED) model 60C00WCR.

HOUSING. REAR TAIL LIGHT ASSEMBLY

The fixtures shall be mounted on each rear face of the body in a model CAST4, four-(4) light head cast aluminum housing.

SWITCH(ES). REVERSE LIGHTS

One (1) switch(es) will be installed on the apparatus to activate the “Back-up” lights to be used as scene lights.

CLEARANCE LIGHTS AND REFLECTORS

The clearance lights will be LED lights, which include two-(2) red marker lights, four-(4) red rectangular reflectors, two-(2) amber rectangular reflectors and one-(1) red three light cluster recessed in the rear step.

LIGHTS. BRITAX END/CORNER LED

Two-(2) Britax model 427 (12V) LED rubber mounted angled clearance lights will be mounted, one-(1) each side on the rear corners of the apparatus body.

The lights will be wired to the chassis clearance and marker lights. The lens color will be red/amber.

DIRECTIONAL LIGHTS. BODY WHEEL WELL

Two-(2) Britax 428.111.12V auxiliary side directional/marker lights will be provided, one-(1) each side in the body wheel well area and wired to the running lights & turn signals.

LIGHTS. UNDERBODY

There will be six (6) LED underbody light(s) installed at a location to be determined by the Fire Department. The underbody light(s) will illuminate the ground beneath the apparatus.

The lights will be controlled by a switch in the cab.

Located under L4, L6, R4, R6 and two under tailboard

LIGHT LICENSE PLATE

A LED light will be provided at the rear of the apparatus to illuminate the license plate.

LIGHTS. 12-VOLT SURFACE MOUNT SCENE

Four (4) pair of FireTech Guardian model FT-GSM surface mount lights will be provided and installed. The fixture will be designed to attach to the side of the apparatus and emit light both straight down the side of the body at 0 degrees, and in a perpendicular plane to the mounting sheet on to the scene area near the apparatus. The fixture will incorporate 4 rows of LEDs, with the center two rows of 6 LEDs using conical acrylic optics mounted in alignment with each other to a portion of the aluminum fixture body pointing the entire optical and electronic assembly downward 10 degrees. A moisture blocking vent valve will be installed in the body of the fixture to allow for equalization of internal pressure without introduction of moisture in to the housing.

The lens will be manufactured using Covestro materials and resistant to the effects of ultra-violet radiation (must be capable of extended use in direct-sunlight). Furthermore, the fixture will incorporate a mounting system for which the attachment screws never contact the lens, and the fixture will be shipped with an isolating mounting system which prevents galvanic corrosion between the fixture body, screws, and the surface for which it is mounted. The fixture will have a black housing, black rubber gasket, and a chrome trim bezel.

The fixture will be capable of producing 10 lux at a distance of 50 meters when mounted perpendicular to the ground plane at a height of 10 meters, and will produce a total luminous flux “effective lumens” greater than 10,400 lm when measured at steady state temperature in a Goniophotometer or integrating sphere. If “raw” (or not otherwise specified) lumens are to be used elsewhere in the apparatus spec, a comparable output of “10,000 lm” may be referenced related to this fixture. The thermal degradation of the fixture will not exceed 20% from room temp to steady-state temperature. Operating voltage will be 9-32v DC. This fixture will be warranted against defect by the device manufacturer for the entirety of the service life of the apparatus for which it is initially installed.

The scene lights will be controlled by switch located in the cab.

Locations:

- **one (1) pair on cab, upper B pillar area each side**
- **two (2) pair on body, upper B & D zones, inboard of warning lights**
- **one (1) pair on upper rear of body, below warning lights**

ADDITIONAL SWITCH(ES), SCENE LIGHTS

Besides the cab mounted switch(es) for the scene lights there will be five (5) additional switches install on the apparatus to control the scene lights.

Four (4) switches located on the left-hand pump operator's panel.

- **Front Scene**
- **Left Scene**
- **Right Scene**
- **Rear Scene**

One (1) switch on left rear of body for rear scene lights labeled Work Lights

ADDITIONAL SCENE LIGHT WIRING, CAB MOUNTED

The cab mounted scene lights will also be wired to come on when the respective side cab door(s) are opened.

ADDITIONAL SCENE LIGHT WIRING, UPPER REAR MOUNTED

The upper rear body mounted scene lights will also be wired to come one when the transmission is placed into reverse.

LIGHT(S), 12-VOLT BROW MOUNT

One (1) HiViz LEDs FireTech mini brow light(s), Model FT-MB-21-FT-W will be provided. The light will be low in profile with a mounting bracket allowing installation to the top edge of the cab.

Length: 27"

LEDS: 21

Lumens: 11,088 (each)

The scene light(s) will be powered by the 12-volt chassis electrical system.

The light(s) will be warranted against defects for the service life of the apparatus.

FRONT SCENE LIGHTS ACTIVATION

The brow scene lighting will be activated by three (3) switches:

- one (1) on the cab dash labeled Front Scene
- one (1) on the pump panel labeled Front Scene
- one (1) on the front grille area labeled Work Light

GENERATOR

A 10kW PTO driven hydraulically powered generator system shall be supplied and installed. The genset shall be an Onan model CMHG. The genset system shall be capable of producing the nominal output power of 10kW, 120V / 240V, 60 Hz.

BREAKER PANEL

A breaker panel with a 240-volt main breaker and individual 120-volt circuit breakers will be installed. The breaker panel will include a master breaker sized according to the generator output.

Installed on upper back wall of compartment L4.

WIRING PROTECTION

All 120-volt wiring will be run in high temperature, rated at a minimum of 275° F, split loom for easy access to wires when trouble shooting.

120-VOLT ELECTRICAL SYSTEM REQUIREMENTS/TESTING

The following guidelines will apply to the 120/240 VAC system installation:

General-

Any fixed line voltage power source producing alternating current (ac) line voltage will produce electric power at 60 cycles plus or minus 5 cycles.

Except where superseded by the requirements of NFPA 1900, all components, equipment and installation procedures will conform to NFPA 70, National Electrical Code (herein referred to as the NEC).

Line voltage electrical system equipment and materials included on the apparatus will be listed and installed in accordance with the manufacturer's instructions. All products will be used only in the manner for which they have been listed.

Grounding-

Grounding will be in accordance with Section 250-6 "Portable and Vehicle Mounted Generators" of the NEC. Ungrounded systems will not be used. Only stranded or braided copper conductors will be used for grounding and bonding.

An equipment grounding means will be provided in accordance with Section 250-91 (Grounding Conductor Material) of the NEC.

The grounded current carrying conductor (neutral) will be insulated from the equipment grounding conductors and from the equipment enclosures and other grounded parts. The neutral conductor will be colored white or gray in accordance with Section 200-6 (Means of Identifying Grounding Conductors) of the NEC.

In addition to the bonding required for the low voltage return current, each body and driving or crew compartment enclosure will be bonded to the vehicle frame by a copper conductor. This conductor will have a minimum amperage rating of 115 percent of the nameplate current rating of the power source specification label as defined in Section 310-15 (amp capacities) of the NEC. A single conductor properly sized to meet the low voltage and line voltage requirements will be permitted to be used.

All power source system mechanical and electrical components will be sized to support the continuous duty nameplate rating of the power source.

Operation-

Instructions that provide the operator with the essential power source operating instructions, including the power-up and power-down sequence, will be permanently attached to the apparatus at any point where such operations can take place.

Provisions will be made for quickly and easily placing the power source into operation. The control will be marked to indicate when it is correctly positioned for power source operation. Any control device used in the drive train will be equipped with a means to prevent the unintentional movement of the control device from its set position.

A power source specification label will be permanently attached to the apparatus near the operator's control station. The label will provide the operator with the information detailed in Figure 19-4.10. NEC.

Direct drive (PTO) and portable generator installations will comply with Article 445 (Generators) of the NEC.

Overcurrent protection-

The conductors used in the power supply assembly between the output terminals of the power source and the main over current protection device will not exceed 144 inches (3658 mm) in length.

For fixed power supplies, all conductors in the power supply assembly will be type THHW, THW, or use stranded conductors enclosed in nonmetallic liquid tight flexible conduit rated for a minimum of 194-degree Fahrenheit (90 degrees Celsius).

For portable power supplies, conductors located between the power source and the line side of the main over current protection device will be type SO or type SEO with suffix WA flexible cord rated for 600-volts at 194 degrees Fahrenheit (90 degrees Celsius).

Wiring Methods-

Fixed wiring systems will be limited to the following:

Metallic or nonmetallic liquid tight flexible conduit rated at not less than 194 degrees Fahrenheit (90 degrees Celsius)

or

Type SO or Type SEO cord with a WA suffix, rated at 600 volts at not less than 194 degrees Fahrenheit (90 degrees Celsius)

Electrical cord or conduit will not be attached to chassis suspension components, water or fuel lines, air or air brake lines, fire pump piping, hydraulic lines, exhaust system components, or low voltage wiring. In addition, the wiring will be run as follows.

- Separated by a minimum of 12 inches (305 mm), or properly shielded, from exhaust piping
- Separated from fuel lines by a minimum of six (6) inches (152 mm) distance.

Electrical cord or conduit will be supported within six (6) inches (152 mm) of any junction box and at a minimum of every 24 inches (610 mm) of continuous run. Supports will be made of nonmetallic materials or corrosion protected metal. All supports will be of a design that does not cut or abrade the conduit or cable and will be mechanically fastened to the vehicle.

Wiring Identification-

All line voltage conductors located in the main panel board will be individually and permanently identified. The identification will reference the wiring schematic or indicate the final termination point.

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When pre wiring for future power sources or devices, the unterminated ends will be labeled showing function and wire size.

Wet Locations-

All wet location receptacle outlets and inlet devices, including those on hardwired remote power distribution boxes, will be of the grounding type provided with a wet location cover and installed in accordance with Section 210-7 "Receptacles and Cord Connections" of the NEC.

All receptacles located in a wet location will be not less than 24 inches (610 mm) from the ground. Receptacles on off-road vehicles will be a minimum of 30 inches (762 mm) from the ground.

The face of any wet location receptacle will be installed in a plane from vertical to not more than 45 degrees off vertical. No receptacle will be installed in a face up position.

Dry Locations-

All receptacles located in a dry location will be of the grounding type. Receptacles will be not less than 30 inches (762 mm) above the interior floor height.

All receptacles will be marked with the type of line voltage (120-volts or 240-volts) and the current rating in amps. If the receptacles are direct current, or other than single phase, they will be so marked.

Listing-

All receptacles and electrical inlet devices will be listed to UL 498, Standard for Safety Attachment Plugs and Receptacles, or other appropriate performance standards. Receptacles used for direct current voltages will be rated for the appropriate service.

Electrical System Testing-

The wiring and associated equipment will be tested by the apparatus manufacturer or the installer of the line voltage system.

The wiring and permanently connected devices and equipment will be subjected to a dielectric voltage withstand test of 900-volts for one-(1) minute. The test will be conducted between live parts and the neutral conductor, and between live parts and the vehicle frame with any switches in the circuit(s) closed. This test will be conducted after all body work has been completed.

Electrical polarity verification will be made of all permanently wired equipment and receptacles to determine that connections have been properly made.

Operational Test per Current NFPA 1900 Standard-\

The apparatus manufacturer will perform the following operation test and ensure that the power source and any devices that are attached to the line voltage electrical system are properly connected and in working order. The test will be witnessed and the results certified by Underwriters Laboratories. The prime mover will be started from a cold start condition and the line voltage electrical system loaded to 100 percent of the nameplate rating.

The power source will be operated at 100 percent of its nameplate voltage for a minimum of two-(2) hours unless the system meets category certification as defined in the current NFPA 1900 standard. Where the line voltage power is derived from the vehicle's low voltage system, the minimum continuous electrical load as defined in the current NFPA 1900 standard will be applied to the low voltage electrical system during the operational test.

POWER SOURCE SPECIFICATION PLATE

A permanently affixed plate will be installed near operator's position. The plate will provide the operator with the following information:

- Rated voltage(s) and type (AC or DC)
- Phase
- Rated frequency (at rated voltage(s))
- Rated Amperage
- Continuous rated watts
- Power source engine speed

RECEPTACLE(S), 120V HOUSEHOLD

There will be four (4) 120-volt, 15-amp household receptacle(s) installed on the apparatus. The receptacle(s) will be wired to the breaker box. The receptacle(s) will have a weatherproof cover and be a duplex outlet.

located in compartments - L4, L6, R4, and R6

Are to be Shore power and generator power capable.

SWITCH, POWER TRANSFER

There shall be an automatic transfer switch provided and installed on the apparatus. The auto transfer system shall be sized properly to accommodate the load required by these specifications. Further detail shall be provided at the pre-construction conference.

LIGHT TOWER

A Will-Burt Nightscan Series, model number NS2.3-600 (WHL) 120VAC LED will be provided. The horizontal surface mounted tower will be raised electrically and pneumatically.

Design and Construction:

The compact tower will have an extended height of approximately 7.5 feet above the mounting location and a stowed height of approximately 11 inches above the mounting surface. The tower will be designed to sustain the intended top load with a 125 percent safety factor and will withstand a maximum 65 miles/hour wind when in a fully raised and unguided position.

The base of the tower assembly will have weather resistant plastic enclosure installed. The tower tubular sections will be constructed of high strength, heat-treated 6061-T6 aluminum tubes and collars. Each tube and collar will be protected by low friction synthetic bearings for smooth operation and long life. Bumpers will be designed to reduce shock on extension and retraction. All exterior surfaces will be anodized and sealed for long life and fasteners will be stainless steel for corrosion resistance.

Nesting System:

The tower will be equipped with an “auto-stow” function. Holding the mast down toggle switch will return the lights to the home position, retract and lower the mast, and automatically shut power off to the tower. An integral saddle assembly with cushioned rests will be provided for the mast and flood light assembly.

Floodlight Rotation and Tilt Operation:

The tower will be equipped with a Will Burt Model RCP (remote control positioner) to control the rotation and direction of the lights. The remote-control positioner unit will be equipped with two (2) gear motors, one for rotation and one for tilting of the floodlight assembly. The positioner will rotate the floodlights from zero to 350 degrees.

A hand-held remote-control pendant, connected to a 25 ft. cord, will be provided to control the tower. All functions of the light tower are back lit and will be accessible through this remote control including raising, "auto-stow", and rotation and tilting of the floodlight assembly, and floodlight switching.

Pneumatic Controls:

For raising and lowering the pneumatic tower the air source will be supplied from an integral compressor with air regulator. The tower will be able to elevate completely in approximately 30 seconds. In the event of malfunction of the elevating system while the tower is in operation or during deployment, a method of limiting the rate of descent will be provided to prevent injury to personnel or damage to the equipment.

Electrical Installation:

The wiring harness for the floodlights, accessories, and remote-control positioner will be internally routed through telescoping aluminum tubing with a highly flexible coil cord. Installer supplied 12-volt electrical wiring will be provided with electrical connections at the tower assembly. The installer as required by manufacturer's installation guidelines will provide appropriate 12-volt wiring for connection to the tower.

The 12-volt power to the tower and light units will automatically disconnect whenever the tower is in the nested position. A mast extension indicator will be provided. The installer will provide warning lights in the body and cab with labels, parking brake interlocks, and other equipment as required by applicable NFPA standards.

Floodlight System:

Four (4) Whelen Pioneer PFP2 LED flood lamp head's will be provided on the light tower assembly, for a total light output of 600 watts. Each lamp head is a 150-watt LED, 120-volt fixture producing 14,000 lumens. Wiring to the Whelen flood/flood light assemblies will be concealed to the remote-control positioner.

The housing and lens frame will be constructed from pressure cast aluminum with a white powder coat finish. Each lamp head will be approximately 3 inches deep, 4-1/4 inches high and approximately 14 inches wide.

Warranty:

The tower assembly will carry a two (2) year parts and labor warranty. Exact provisions of such warranty will be provided with the proposal and at time of delivery of product.

Labeling and NFPA Compliance:

Essential operating instructions and warning labels will be provided in compliance to applicable OSHA, SAE, and NFPA standards. Appropriate labels on the "hazards of electrocution" associated with the operation of a light tower will be installed in the appropriate areas.

A label will be provided at the operator's position with the following information:

1. Extended height of the tower from the ground
2. Bulb replacement data

The tower and installation will be in full compliance to applicable sections of the current NFPA 1900 Standard.

Light tower controls shall be located in compartment L3 - pump operator's compartment.

SHIELD, LIGHT TOWER

The light tower will be protected by an aluminum shield that is bolted to the cab roof. It will be constructed of 1/8" painted smooth aluminum.

REEL, ELECTRIC CORD

There will be one (1) Hannay Model ECR1618-17-18, electric rewind electric cord reel(s) provided. The cord reel will have 200' of 10-3 wire cord. The reel will be mounted as directed and will be controlled by a 12-volt switch. The cord reel will be wired to the breaker panel.

The electrical cord provided on the reel will be yellow in color.

The electric cord reel will be installed in the specified compartment.

Location: roof compartment TR1, rear, paying out through compartment R3 below.

HOSE/CORD ROLLER

There will be one (1) 4-way roller assembly installed to guide the hose/cord on and off the spool to prevent chafing of the apparatus paint.

HOSE/CORD STOP(S)

There will be one (1) Hannay hose/cord stop(s) model HS-3 attached at the end of each hose/cord.

PLATE, POWER REWIND REEL

A permanently affixed plate will be installed in a readily visible location adjacent to any permanently connected reel that indicates the following:

Current Rating

- Current Type
- Phase
- Voltage
- Total Cable Length

PAINT FINISH, CAB/BODY

The apparatus cab/body paint process will meet or exceed current state regulations concerning paint operations. Pollution control will include measures to protect the atmosphere, water, and soil. Contractor will, upon demand, provide evidence that the manufacturing facility is in compliance with State EPA rules and regulations.

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The body exterior will have no mounted components prior to painting to assure full coverage of metal treatments and paint to the exterior surfaces of the body. Any vertically or horizontally hinged smooth-plate compartment doors will be painted separately to assure proper paint coverage on body, door jambs and door edges.

Any location where aluminum is penetrated after painting, for the purpose of mounting steps, hand rails, doors, lights, or other specified components will be treated at the point of penetration with a corrosion inhibiting pre-treatment (ECK Corrosion Control). The pre-treatment will be applied to the aluminum sheet metal or aluminum extrusions in all locations where the aluminum has been penetrated. All hardware used in mounting steps, hand rails, doors, lights, or other specified components will be individually treated with the corrosion inhibiting pre-treatment.

After the paint process is complete, the gloss rating of the unit will be tested with a 60-degree gloss meter. Coating thickness will be measured with a digital MIL gauge and the orange peel with a digital wave scan device.

PAINT COLOR/CODE

The paint color/code will be red FLNA 31979.

Exact color shall be verified with a paint chip, to match existing apparatus

Any and all items in the specification designated to be painted red, shall be painted/repainted job color red.

CAB PAINT FINISH, TWO TONE

The custom cab will have a two-tone paint finish. The paint colors will be furnished by the customer. The break in the color will be at the bottom of the chassis window, unless otherwise specified by the department.

All cab exterior components including doors and glass, will be removed. The complete cab exterior will be thoroughly sanded, solvent cleaned and finished with high luster polyurethane paint before mounting of body to assure full coverage of paint to all surfaces

PAINT COLOR/CODE

The paint color/code will be white FLNA 41477.

Exact color shall be verified with a paint chip, to match existing apparatus

STRIPE, CAB PAINT BREAK LINE

A 1/4" wide black pin stripe will be applied at the cab paint break line.

STRIPE, REAR CHEVRON

A minimum of fifty percent of the rear vertical surface of the unit will be overlaid with a reflective material, installed in an alternating "Chevron" pattern (sloping down and away from the centerline) at a 45-degree angle. Each stripe will be 6" wide and the colors of stripping will be in compliance, with the current edition of NFPA 1900.

The Chevron striping will be 3M red and fluorescent yellow green.

Chevron colors shall be red and white.

REFLECTIVE MATERIAL, DESIGNATED WALKING SURFACES

1" wide yellow perimeter marking consisting of individual Reflexite diamonds will be applied to indicate the outside edge of designated standing and walking areas above 48" from the ground in compliance with 2016 NFPA 1900. Steps, ladders and areas with a railing or structure at least 12" high are excluded from this requirement.

WARRANTY, BODY MATERIAL & WORKMANSHIP

The purchaser will receive a general one-(1) year or 24,000 miles limited warranty in accordance with, and subject to, warranty certificate RFW0002. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

WARRANTY, CUSTOM CHASSIS MATERIAL & WORKMANSHIP

The purchaser will receive a custom chassis one-(1) years or 24,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0102. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

WARRANTY, CAB STRUCTURAL

The purchaser will receive a cab structure (Aluminum) ten-(10) years or 100,000 miles limited warranty in accordance with, and subject to, warranty certificate RFW0602. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

WARRANTY, BODY STRUCTURAL

The purchaser will receive a body structure (Aluminum) ten-(10) years or 100,000 miles limited warranty in accordance with, and subject to, warranty certificate RFW0502. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

WARRANTY, CAB PAINT / PERFORATION

The purchaser will receive a paint and finish (Exterior Clear coated) ten-(10) years limited warranty in accordance with, and subject to, warranty certificate RFW0710. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

WARRANTY, BODY PAINT / PERFORATION

The purchaser will receive a paint and finish (Exterior Clear coated) ten-(10) years limited warranty in accordance with, and subject to, warranty certificate RFW0710. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

WARRANTY. FRAME ASSEMBLY STRUCTURE

The purchaser will receive a frame assembly structural fifty-(50) years or 250,000 miles limited warranty in accordance with, and subject to, warranty certificate RFW0305. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

WARRANTY. MERITOR AXLE

FRONT AXLE

The front axle will be warranted by Meritor for five-(5) years with unlimited miles under the general service application.

REAR AXLE

The rear axle will be warranted by Meritor for five-(5) years with unlimited miles under the general service application.

WARRANTY. DIESEL ENGINE

The Cummins engine will be warranted for a period of five-(5) years or 100,000 miles, whichever occurs first.

WARRANTY. REGULATED EMISSIONS SYSTEMS

Non-California Engines-

The purchaser will receive a Regulated Emissions Systems five-(5) years or 100,000 miles limited warranty in accordance with, and subject to, warranty certificate RFW0140. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

Cummins L9 California Engines-

The purchaser will receive a Regulated Emissions Systems five-(5) years or 150,000 miles limited warranty in accordance with, and subject to, warranty certificate RFW0141. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

Cummins X12 / X15 California Engines-

The purchaser will receive a Regulated Emissions Systems five-(5) years or 350,000 miles limited warranty in accordance with, and subject to, warranty certificate RFW0142. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

WARRANTY. TRANSMISSION

The Allison EVS series transmission will be warranted for a period of five-(5) years with unlimited mileage. Parts and labor will be included in the warranty.

WARRANTY. ANTILOCK BRAKE SYSTEM

The ABS brake system will be warranted for a period of three-(3) years/300,000 miles.

WARRANTY. WATEROUS

A Waterous 7-year pump warranty shall be included with each proposal. Full details of the warranty shall be included with each proposal.

WARRANTY. PLUMBING SYSTEM

The purchaser will receive a plumbing and piping corrosion-free (Stainless Steel) ten-(10) years or 100,000 miles limited warranty in accordance with, and subject to, warranty certificate RFW0801. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

WARRANTY. WATER TANK

The poly tank manufacturer warrants each tank to be free from manufacturing defects in material and workmanship for the service life of the original vehicle (vehicle must be actively used in fire suppression). The warrant is transferable, with written approval of the manufacturer. Each tank is inspected and tested for leaks prior to leaving the manufacturing facility. The tank will be installed in the vehicle in accordance to the manufacture's guidelines.

There are no warranties, expressed or implied, which extend beyond the description of the face hereof. There is no expressed or implied warranty of merchantability or a warranty of fitness for a particular purpose. Additionally, this warranty is in lieu of all other obligations or liabilities on the part of the Manufacturer.

MANUAL. CHASSIS OPERATION

There will be two-(2) digital copies of the chassis operation manual provided with the chassis. The digital data will include a parts list specific to the chassis model.

MANUALS. ENGINE AND TRANSMISSION OPERATION

There will be two-(2) printed hard copy sets of the engine operation manual and two-(2) printed hard copy sets of the transmission operation manual specific to the model ordered included with the chassis.

MANUALS. APPARATUS BODY

The contractor will supply, at time of delivery, at two-(2) sets of complete operation and service documentation covering the completed apparatus as delivered and accepted.

The documentation will address at least the inspection, service, and operations of the fire apparatus and all major components thereof.

All operation and service manuals will be publicly accessible on the manufacturer's web site.

MANUALS. FIRE PUMP

There will be two-(2) copies of pump manuals provided to the department.

SAFETY GUIDE

One-(1) copy of the latest edition of FAMA's Fire Apparatus Safety Guide will be provided with the completed apparatus.

WIRING DIAGRAMS. CAB/CHASSIS

There will be a complete digital set of electrical schematics provided at the time of delivery. These schematics will have each circuit properly numbered and in color.

The schematic will show each connector in the circuitry and the position in which each circuit enters, exits, or terminates. The schematic will be drawn in such a manner as to allow individual circuitry to be followed throughout the apparatus.

These schematics will not have the circuitry condensed into a single line or sets of lines. Multiple sheets will be acceptable so long as each of the harnesses is properly identified to the connecting sheet and harness. There will be a border around the paper(s), which contain alpha and numeric characters for indexing coordinate reference. There will be an indexing or part reference document for quick location of items shown on the schematics.

WIRING DIAGRAMS. APPARATUS BODY

There will be a complete set of generic electrical schematics provided at the time of delivery. These schematics will have each circuit properly numbered and in color.

The schematic will show each connector in the circuitry and the position in which each circuit enters, exits, or terminates. The schematic will be drawn in such a manner as to allow individual circuitry to be followed throughout the apparatus.

These schematics will not have the circuitry condensed into a single line or sets of lines. Multiple sheets will be acceptable so long as each of the harnesses is properly identified to the connecting sheet and harness. There will be a border around the paper(s), which contain alpha and numeric characters for indexing coordinate reference. There will be an indexing or part reference document for quick location of items shown on the schematics.

This document will refer the user to the appropriate drawing and page number and to sections of the drawing(s) by the means of letter and number coordinates. The schematic will show all harnesses used in the apparatus cab, chassis and body that is supplied by the chassis and body manufacturer.

Modifications to the manufactured standard harnesses are to be documented and properly indexed for quick identification.

A complete wire number, color, and function listing will accompany the schematics.

LADDER(S). 10' FOLDING

There will be one (1) Duo-Safety Model 585-A, 10' folding ladder(s) provided with the apparatus. The ladder(s) will be aluminum, single-section with rubber feet. The ladder(s) will meet or exceed the latest NFPA standards.

LADDER(S). 14' ROOF

There will be one (1) Duo-Safety model 775-A, 14' roof ladder(s) supplied with the apparatus. The ladder(s) will be aluminum, single-section with folding steel roof hooks on one end and steel spikes at the other. The ladder(s) will meet or exceed the latest NFPA standards.

LADDER(S). 24' 2-SECTION EXTENSION

There will be one (1) Duo-Safety model 900-A, 24' two-section ladder(s) supplied with the apparatus. The extension ladder(s) will be aluminum with steel spurs on one end. The ladder(s) will meet or exceed the latest NFPA standards.

WHEEL CHOCS

There will be a pair of Ziamatic model SAC-44-E folding wheel chocs supplied with the apparatus.

HOLDER, WHEEL CHOCS

There will be a Ziamatic model SQCH-44-H horizontal wheel choc holder installed on the apparatus as directed.

Location: below L4

EQUIPMENT MOUNTING

A \$10,000.00 allowance shall be included with each proposal for the mounting of tools and equipment supplied by the Malverne Fire Department. The equipment shall be installed by the manufacturer or dealer prior to final delivery.

COMMUNICATION EQUIPMENT INSTALLATION

The following equipment shall be **SUPPLIED BY THE FIRE DEPARTMENT** and installed on the apparatus prior to final delivery:

- one-(1) CDM1250 low band mobile radio with the following accessories:
 - single remote head mount kit; radio head to be installed on top of center dash on driver's side
 - remote speaker microphone
 - external speaker in officer's cab
 - external speaker with volume control in crew cab

- one-(1) Motorola APX8000 "all-band" mobile radio with the following accessories:
 - single remote head mount kit; radio head to be installed on top of center dash on officers' side
 - palm style remote speaker microphone
 - external speaker in officer's cab
 - external speaker with volume control in crew cab

- two-(2) single unit portable radio chargers on top of the engine tunnel mounting plate

- six-(6) single unit portable radio chargers
 - two-(2) on the back of the engine tunnel on each side

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- three-(3) on the forward-facing seat riser between the crew cab seats

The location of all equipment shall be verified with the Malverne Fire Department prior to installation.

GRAPHICS

A \$10,000 allowance shall be included with each proposal for the installation of graphics. All graphics shall be approved by the Malverne Fire Department and installed prior to final delivery.

INCORPORATED VILLAGE OF MALVERNE

BID FORM

ONE (1) 2000 GPM RESCUE PUMPER

Each vendor shall fill out in ink, in both words and figures, in the spaces provided, the bid price. If there is any discrepancy between the prices in words and figures, the prices in words shall govern as unit and lump sum prices.

BIDDER COMPANY NAME: _____

COMPANY ADDRESS: _____

COMPANY F.E.I.N.: _____

TELEPHONE # _____

SIGNED BY: _____

TITLE: _____

DATE: _____

BID AMOUNT: _____
(In Figures)

BID AMOUNT: _____
(Spelled out)

Incorporated Village of Malverne
Non-Collusive Bidding Certification

By submission of this bid, each Bidder and each person signing on behalf of any Bidder certifies, and in the case of a joint bid, each party thereto certifies as to its own organization under penalty of perjury, that to the best of his/her knowledge and belief:

1. The prices of this bid have been arrived at independently without collusion , consultation , communication, or agreement, for the purpose of restricting competition, as to any matter relating to such process with any other bidder or with any competitor;

2. Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the Bidder and will not knowingly be disclosed by the Bidder prior to opening, directly or indirectly to any other Bidder or to any competitor; and

3. No attempt has been made or will be made by the Bidder to induce any other person partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.

Firm Name

By: _____

Signature

Print Name: _____

Title: _____

Date: _____

Incorporated Village of Malverne
INDEMNIFICATION/HOLD HARMLESS AGREEMENT

The Vendor/Contractor shall indemnify and hold harmless the Incorporated Village of Malverne, its officers, employees, and/or agents from any and all liability, damage, loss, claims, demands and actions of any nature whatsoever, for any reason whatsoever, foreseeable or unforeseeable, which arises out of or is connected with, or is claimed to arise out of to be connected with, any undertaking, product, goods, merchandise, products, services sold and/or work supplied, furnished or performed by the Vendor/Contractor or its subcontractors, agents, servants, or employees, including without limiting the generality of the forgoing, all liability, damages, loss, claims, attorneys, court and adjusting fees, demands and actions on account of personal injury, death or property loss to the Incorporated Village of Malverne its officers, employees, agents or to any other persons, third parties, or property, but shall not include claims resulting from the gross negligence or willful misconduct of the Incorporated Village of Malverne. This indemnity and hold harmless is intended to be as broad as is permitted by law and to include claims of every kind and nature – for tort, under contract; for strict liability or other liability without fault; under statute, rule, regulation or order; and otherwise.

IN WITNESS WHEREOF, the undersigned has duly executed this Agreement the ____ day of _____, 20__.

Name of Firm: _____
Please Print

Address: _____
Please Print

Contractor's Signature: _____

Please Print Name: _____

Please Print Title: _____

Date