INVITATION TO BID

INSTRUCTIONS TO BIDDERS

Sealed bids will be received by the City of Somerset Fire Department until the actual time and date listed in the Request for Bid at City Hall, Somerset, Kentucky for the furnishing of all necessary labor, equipment and material for the Fire Apparatus, and other equipment as outlined in the following specifications.

Bids will be addressed and submitted in accordance with the instructions provided above. The type of bid, bid opening date and time will be stated on the front of the bid envelope.

All specifications herein contained are considered as minimum. No exceptions to these minimum standards will be allowed relating to gauge, alloy, and type of metal, size of compartments and overall design. Bidders must state the brand of any item provided which is a substitute for the brand or model specified for evaluation by the bidder. The buyer reserves the right to require a bidder to provide proof in each case that a substituted item is equal to that specified. The buyer will be the sole judge in determination of acceptable substitutes.

Submit only one (1) bid that meets or exceeds the minimum specifications. No substitutes, stock units, or alternates will be permissible unless such units are requested later in the specifications. If this is done, the bidder will be automatically disqualified.

This apparatus will conform to the current edition of the National Fire Protection Association Pamphlet No. 1901.

All bids must be signed. Failure to do so will cause the bid to be non-responsive and rejected.

The competency and responsibility of Bidders will be considered in making the award. The Fire Department reserves the right to reject any or all bids, or to reject the bid of the 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 contact and does not obligate itself to accept the lowest or any bid.

It will be the responsibility of the bidder to assure that their proposal arrives at the proper location by the time indicated. Late proposals, telegrams, facsimile, 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 because to reject the bid as irregular and disqualified from consideration.

To make it easier on the Fire Department bid proposal specifications shall be in the same order as these specifications.

A written review of the company, in chronological order, detailing the background of the manufacturer shall be provided as part of the Bid proposal.

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

The body is to be completely built, painted, and installed by the prime body manufacturer, which minimizes third party involvement on engineering, design, service, and warranty issues. Apparatus using a subcontracted body will not be acceptable.

THE PURCHASER WILL NOT ACCEPT ANY BIDS, WHICH DO NOT MEET THESE SPECIFICATIONS AND IS THE SOLE DECIDER TO DEEM WHICH BID IS IN THE BEST INTEREST OF THE PURCHASER.

CUSTOM RESCUE PUMPER SPECIFICATIONS SOMERSET FIRE DEPARTMENT	Bidder Complies	
	Yes	No

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 ten-(10) 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. The body will be modular in design and construction of the latest modern type, for transfer of body to another chassis without cutting or welding.

Each bidder must submit 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. 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. Thus, render such proposal ineligible for award.

For the purpose of evaluation of the construction methods, components, and materials from various vendors the make up the apparatus body, the Fire Department may request each bidder to supply a cross section of a side body compartment no smaller the 1/4” in scale using full size components including the compartment door and hardware.

Sample will remain with the fire department for a minimum of fourteen-(14) days after the bid opening.

PAYMENT TERMS

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

EXCEPTIONS

These specifications are based upon design and performance criteria, which have been developed by the fire department because of extensive research and careful analysis. Subsequently these specifications reflect the only type of fire apparatus that is acceptable at this time. Therefore, major exceptions to specifications will not be accepted.

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 complete and submitted with the bid. Omissions and variations will result in immediate rejection of the bid.

Certified engineering performance information and thickness of materials used will be furnished in the bidder specifications.

To the right side of each paragraph of the fire department specifications, the bidder will state "YES" or "NO" indicating compliance with the specifications. All deviations, no matter how slight, will be clearly explained on a separate cover sheet entitled "EXCEPTIONS TO SPECIFICATIONS". Any exceptions or variations to these specifications must be set forth on separate sheets, indicating page number (s) of the specifications, and must be submitted with the bid. Any bids deemed as taking total exception to these published specifications will result in immediate rejection of the bid.

Proposals that are found to have deviations without listing them will be rejected. No Exceptions

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

VEHICLE STABILITY

The height of the fully loaded is vehicle 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 min (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 approximately 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 min (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).

If the apparatus is equipped with an auxiliary braking system, the apparatus manufacturers will road test the system to confirm that the 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 approximately 20 mph (32 km/h) in a distance not exceeding 35 feet min (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

INFORMATION/CERTIFICATIONS

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

(1) The manufacturer's record of apparatus construction details, including the following information:

- (a) Owner's name and address
- (b) Apparatus manufacturer, model, and serial number
- (c) Chassis make, model, and serial number
- (d) GVWR of front and rear axles
- (e) Front tire size and total rated capacity in pounds (kilograms)
- (f) Rear tire size and total rated capacity in pounds (kilograms)
- (g) Chassis weight distribution in pounds (kilograms) with water and manufacturer-mounted equipment (front and rear)
- (h) Engine make, model, and serial number, rated horsepower, related speed and governed speed
- (i) Type of fuel and fuel tank capacity
- (j) Electrical system voltage and alternator output in amps
- (k) Battery make, model, and capacity in cold cranking amps (CCA)
- (l) Chassis transmission make, model, and serial number; and if so equipped, chassis transmission PTO(s) make, model, and gear ratio
- (m) Pump make, model, rated capacity in gallons per minute (liters per minute where applicable), and serial number
- (n) Pump transmission make, model, serial number, and gear ratio
- (o) Auxiliary pump make, model, rated capacity in gallons per minute (liters per minute where applicable), and serial number
- (p) Water tank certified capacity in gallons or liters
- (q) Foam tank (if provided) certified capacity in gallons or liters
- (r) Paint manufacturer and paint number(s)
- (s) Company name and signature of responsible company representative

(2) Certification of slip resistance of all stepping, standing, and walking surfaces

(3) If the apparatus has a fire pump or an industrial supply pump, the pump manufacturer's certification of suction capability

(4) If the apparatus has a fire pump or an industrial supply pump, a copy of the apparatus manufacturer's approval for stationary pumping applications

(5) If the apparatus has a fire pump or an industrial supply pump, the engine manufacturer's certified brake horsepower curve for the engine furnished, showing the maximum governed speed

(6) If the apparatus has a fire pump or an industrial supply pump, the pump manufacturer's certification of the hydrostatic test

(7) If the apparatus has a fire pump or an industrial supply pump, the certification of inspection and test for the fire pump or the industrial supply pump

(8) If the apparatus has a fixed line voltage power source, the certification of the test for the fixed power source

(9) If the apparatus is equipped with an air system, test results of due air quality, the SCBA fill station, and the air system installation

(10) Weight documents from a certified scale showing actual loading on the front axle, rear axle(s), and overall fire apparatus (with the water tank full but without personnel, equipment, and hose)

(11) Written load analysis and results of the electrical system performance tests required in Chapter 13

(12) When the apparatus is equipped with a water tank, 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, pump (if applicable), and aerial device

(6) Wiring diagrams for low voltage and line voltage systems to include the following information:

- (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) Precautions related to multiple configurations of aerial devices, if applicable

(10) Instructions regarding the frequency and procedure for recommended maintenance

(11) Overall apparatus operating instructions

(12) Safety considerations

(13) Limitations of use

(14) Inspection procedures

(15) Recommended service procedures

(16) Troubleshooting guide

(17) Apparatus body, chassis, and other component manufacturer's warranties

(18) Special data required by this standard

(19) Copies of required manufacturer test data or reports, manufacturer certifications, and independent third-party certifications of test results

(20) A material safety data sheet (MSDS) for any fluid that is specified for use on the apparatus

(21) One-(1) copy of the latest edition of FAMA's Fire Apparatus Safety Guide

The Fire Apparatus Manufacture 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 submits the bid, 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.

LIABILITY

The bidder, if his 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 contact.

SINGLE SOURCE MANUFACTURER

To provide the customer with a single point of contact for service, warranty, and parts, proposals shall only be accepted from manufacturers who assemble the complete apparatus in their own facility. The complete chassis and body shall be constructed and assembled in the same location. **NO EXCEPTION**

VIRTUAL MANUFACTURING

The manufacturer shall have a web site available for the customers to 'watch' their unit being produced. The "Trucks in Production" shall be updated a minimum of three-(3) times per week.

The web site shall also include documentation of cab and body crash tests, take a virtual tour of the production facility, videos of both current and new innovative products, updates on trade shows, photos of new deliveries and the opportunity to include customer 'Action Photo's'.

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

PRINCIPAL DIMENSIONS

The apparatus shall approximately have the following dimensions:

Overall Length: 35’
Overall Height: 10’
Wheelbase: 218”
Cab to Axle: 156”

CERTIFIED WELDERS

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

BODY WEIGHT DOCUMENTATION

The manufacturer shall weigh each body prior to mounting on the chassis. The information shall be included in the documentation of the finished vehicle. Each body produced by the manufacturer shall be weighed, not just one body per model.

DRAWING, PROPOSAL

There shall be a proposal drawing submitted with the bid proposal. This drawing shall be a visual interpretation of the apparatus proposed and shall include all dimensions, pump make and flow, tank capacity, and customer name.

DRAWING, APPROVAL

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

PRE-CONSTRUCTION CONFERENCE

A pre-construction conference will be held at the factory prior to the actual construction of the vehicle(s). The conference will be held in the manufactures facility with four (4) representatives of the Somerset Fire Department and appropriate representatives of the manufacturer.

Lodging and meals will be the responsibility of the manufacturer.

Transportation will be the responsibility of the Somerset Fire Department.

INSPECTION TRIP, FINAL

There will be a final inspection for four (4) 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. Factory and Sales representatives will be available at the time of inspection.

The final inspection will include as a minimum:

-Full access to the build file and factory personnel to provide answers for any issues found.
-Unit will be placed on a lift that will allow full inspection of the undercarriage.
-Road test shall be accommodated.
-Unit will be taken to pump test area where the pump and plumbing can be inspected while flowing water.
-General apparatus orientation and operation shall be provided at the pump test pit.

Lodging and meals will be the responsibility of the manufacturer.

Transportation will be the responsibility of the Somerset Fire Department.

TRANSPORTATION

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

DELIVERY TIME

The manufacturer shall state the delivery time in bid proposal in days.

VEHICLE FAMILIARIZATION & DEMONSTRATION

Familiarization and demonstration of the vehicle shall be by a competent and qualified person as defined in the current standard of NFPA 1901 standard.

Familiarization of the vehicle shall 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:

a) Setting of parking brake, proper transmission gear, and fire pump engagement operations
b) Throttle control
c) Primer and tank-to-pump operation
d) Use of pressure control devices
e) Tank refilling operations
f) Proper operation of discharge controls
g) Proper shutdown and draining of system

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

a) Proper engagement if driven by the chassis
b) Startup, operation, and shutdown of generator
c) Monitoring of controls and instruments

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

a) Startup, operation, and shutdown of foam system
b) Setting of foam percentages and other operational settings
c) Proper flushing and draining of the system

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

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

MANUFACTURER SERVICE CONTACTS

The manufacturer must have a 24 hour/ 7 day a week, toll-free emergency hot line. The manufacturer must be capable of providing both in-house and on-site service for the apparatus. The service technicians shall be EVT certified in compliance with NFPA 1071 classifications F2 through F6. On-site service and maintenance shall be the primary function, to eliminate the vehicle having to leave the fire department jurisdiction. Copies of the certifications shall be made available through the Human Resources office.

SERVICE VEHICLES

The manufacturer shall have company owned, service vehicles. The vehicles shall be available 24 hours a day, seven days a week to respond to customer needs. The Service Vehicles shall be operated by full time EVT Certified Technicians.

REPLACEMENT PARTS

Replacement parts shall be available directly from the manufacturer, as well as the dealer and or service centers.

SERVICE CENTER

Name and address of closed service center shall be included in bid proposal.

AMERICAN OWNED

Bidding manufacturers shall be wholly owned by United States of America corporations or entities. No bids will be considered from manufacturers which are owned by outside entities.

CUSTOM CHASSIS

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

Each custom cab and chassis shall be manufactured in strict compliance with all applicable requirements as set forth in the current edition of the NFPA (National Fire Protection Association) pamphlet 1901 with maximum safety as the key focus throughout the design and development phase of each fire and rescue chassis.

CHASSIS WHEELBASE

The chassis wheelbase shall be 215-218 inches.

CHASSIS FRAME RAILS

The chassis frame rails shall be constructed of steel that has been formed into a "C" channel shape with approximate dimension of 10.50" x 3.50" x .375 inches.

The frame rails shall be powder coated insuring superior paint adhesion. Frame cutouts for the engine shall be made with a plasma torch minimizing the heat-affected zones.

All frame-mounted components shall be secured with Grade eight bolts, hardened washers, and distorted thread lock nuts. Flanged head bolts with nylon locking nuts, or huck bolts shall not be acceptable.

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.

The ruggedized, protective coating within these specifications is a 100% solids, state-of-the art, VOC-free, plural-component, pure polyuria elastomeric membrane. This seamless system exhibits extraordinary performance characteristics. It is based on amine-terminated polyether resins, amine chain extenders and MDI pre-polymers. This membrane achieves an extremely tough, flexible, chemical and abuse resistant finish.

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 black.

TOW HOOKS, FRONT

Two-(2) painted tow hooks shall be mounted to the bottom of the front bumper frame extension rails. The tow hooks shall be attached with Grade 8 bolts.

FRONT BUMPER EXTENSION

There shall be a twenty-four inch (24") frame extension provided. The extension shall be made from heavy-duty steel in both C-channel and tubular shapes. The frame rail extension material shall measure approximately 7" high x 3-1/2" wide x .375" wall thickness.

Extension shall be bolted to the chassis frame rails through reinforcement plates, backed by the engine mounting cross member. Fasteners utilized shall be Grade 8 bolts.

AIR HORN WIRING

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

FRONT AXLE

The front axle shall be a Meritor or equivalent MFS-20 with 20,000-pound capacity equipped with oil seals and transparent cover for oil level inspection.

STEERING SYSTEM

The steering system shall be a package certified by TRW for the application. All components from the steering column to the drag link shall be manufactured by TRW.

The steering system shall use a TAS-65 steering gear or equivalent with an RCS-55 slave gear, which has the capacity to static steer the chassis loaded to 21,500 pounds with 425-size tires. The use of two-(2) equal size gears or a single gear with an assist cylinder shall not be acceptable.

CHASSIS ALIGNMENT

The chassis frame rails shall be measured to insure the length is correct and cross checked to make sure they run parallel and are square to each other. The front and rear axles shall be laser aligned. The front tires and wheels shall 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 shall be parabolic (taper leaf) spring type or equivalent, with three-(3) leaves 20,000 pounds capacity. The leaves shall be a minimum of 4" wide x 54" long (flat), with grease fittings for lubrication installed in the spring pins. Axle stops with energy absorbing jounce bumpers shall be supplied on the spring top pad. Double acting Koni shock absorbers or equivalent shall be provided on the front suspension.

FRONT BRAKES

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

CRAMP ANGLE

The cramp angle of the front axle shall be 43 degrees.

FRONT TIRES

The front tires shall be Goodyear 385/65R22.5 Load Range "J" G-296 MSA all-weather treads or equivalent.

The Intermittent Fire Service load capacity shall be 20,000 pound with a speed rating of 68 miles per hour when properly inflated to 120 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.

FRONT WHEELS

The front axle wheels shall be Accuride steel discs or equivalent with a 10-hole pattern.

FRONT WHEEL FINISH

The wheels shall be painted to match the job color.

MUD FLAPS, FRONT

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

REAR AXLE

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

REAR SUSPENSION

The rear axle suspension shall leaf spring type rated at 31,500 pounds capacity. The main spring pack shall have thirteen (13) leaves with a four (4) leaf auxiliary pack. The suspension shall be a torque leaf, variable rate, self-leveling slipper type.

REAR AXLE DIFFERENTIAL

The Meritor RS series rear axle, or equivalent, shall have a standard differential.

VEHICLE TOP SPEED

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

REAR BRAKES

The rear axle shall be equipped with 16-1/2" x 7" S-Cam air operated brakes or equivalent with automatic slack adjusters.

REAR TIRES

The rear tires shall be Goodyear or equivalent 315/80R22.5 Load Range "J" Regional RHD II rocky environment traction treads.

The Intermittent Fire Service load capacity shall be 31,500 pound with a speed rating of 75 miles per hour when properly inflated to 125 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.

REAR WHEELS

The rear axle wheels shall be Accuride steel disc or equivalent with a 10-hole pattern.

REAR WHEEL FINISH

The wheels shall be painted to match the job color.

TIRE PRESSURE MONITORING SYSTEM

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

HOSE AND HARNESS ROUTING

Battery cables, hydraulic hoses and air lines shall 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 shall not be acceptable.

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

AIR BRAKE SYSTEM

The air brake system shall meet the requirements of FMVSS-121. The system shall consist of three-(3) reservoirs with a total capacity of 5100 cubic inches. The system shall be of dual circuit and quick build up design powered by an engine mounted gear driven air compressor. The system shall 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 shall be plumbed utilizing reinforced nylon air lines in conformance to SAE J 844-94, Type B and USDOT standards. All of the airlines shall be color coded to correspond with an air system schematic and shall be adequately protected from heat and chafing.

Color coding shall 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 shall be plumbed with stainless steel braided hose lines with a Teflon lining.

The system shall be plumbed using color-coded nylon airlines with brass push-lock fittings.

COMPRESSOR

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

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

The chassis air system shall meet NFPA 1901, latest edition for rapid air pressure build-up within

sixty - (60) seconds from a completely discharged air system. This system shall provide sufficient air pressure so that the apparatus has no brake drag and is able to stop under the intended operating conditions following the sixty - (60) second build-up time.

ANTI-LOCK BRAKES W/ATC & ELECTRONIC STABILITY CONTROL

The apparatus shall have a Wabco ABS-based Electronic Stability Control (ESC) or equivalent, 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 shall 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 or equivalent 4-channel Anti-Lock Braking System shall be installed which includes four-(4) wheel sensors and four-(4) modulators to control and compensate braking force at each wheel. This system shall monitor all wheel ends regardless of suspension type, and which axle it sees braking forces first.

An ABS warning light shall 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 shall 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.

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

A mud and snow switch shall be provided. When the switch is in the "ON" position, it shall 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) shall be acted upon.

AIR DRYER

The air system shall include a Bendix or equivalent AD-9 air dryer with integral 12-volt heated moisture ejector. The air dryer shall 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.

ENGINE

The vehicle shall be equipped with a Cummins ISL 450 turbocharged diesel engine or equivalent. Standard features include an electronic governor and an 18.7 CFM compressor. The oil filter shall be a full flow and bypass design.

This engine conforms to the US 2016 EPA regulations for heavy-duty diesel engines.

Specifications-
Model: ISL
Number of Cylinders: Six (6)
Bore and Stroke: 4.49" X 5.69"
Displacement: of 8.9 L
Rated Horsepower: 450 @ 2100 RPM
Peak Torque: 1250 @ 1400 RPM

Governed Speed: 2200 RPM

ENGINE COMPRESSION BRAKE

The engine shall come equipped with a Jacobs “C-Brake” compression brake or equivalent controlled by two-(2) switches located in the cab, an on/off and low/medium/high. The compression brake shall interface with the anti-lock brake controller to prevent engine brake operation during adverse braking conditions.

A pump shift, interlock circuit shall be provided to prevent the engine brake from activating during pumping operation.

ENGINE COOLING SYSTEM

The engine cooling system shall have the capacity to cool the engine according to the engine manufacture’s requirements.

RADIATOR

The engine radiator shall be of a bolted design and have a minimum core area of 1400 square inches. The top and bottom tanks shall be stamped 16-gauge steel. The tanks shall be attached to the header assemblies with a minimum of fifty-(50), 5/16" bolts. The spacing between fasteners shall not exceed 2.00 inches in order to minimize the possibility of leaks.

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

The radiator shall contain three rows of tubes with a minimum of 87 tubes per row for a total of not less than 261 tubes. The tubes shall 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 shall be used in the construction of the radiator.

The radiator tubes shall be attached to the header plates with a dual bonding process. The coolant side connection shall be welded, while the air side shall be soldered.

The top tank shall include an integral de-aeration tank, which removes air from the engine water. A low coolant warning shall be incorporated to alert the driver.

The bottom tank of the radiator shall 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 shall be sufficient to cool Allison Transmission without output retarders.

A high efficiency fan shall be direct driven by the engine and surrounded by a fan shroud. The sweep of the fan shall not exceed the width of the radiator core.

CHARGE AIR COOLER

The charge air cooler shall be constructed of aluminum with cast, aluminum side tanks. The cooler shall have a frontal core area of not less than 888 square inches.

The exterior fins shall 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 shall be designed to create air turbulence in order to increase heat transfer efficiency.

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

The piping between the charge air cooler and engine shall use 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 shall be attached with stainless steel constant tension hose clamps.

COOLING SYSTEM FAN

The engine cooling system shall incorporate a thermostatically controlled fan clutch. When the fan clutch is disengaged, the vehicle shall 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 shall automatically lock-up when the vehicle is placed in pumping mode.

A shroud and recirculation shields system shall 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 shall contain a mixture to keep the coolant from freezing to a temperature of -34 degrees F.

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

COOLANT HOSES

The entire chassis cooling system shall have premium rubber hoses.

COOLANT HOSE CLAMPS

Gates PowerGrip clamps, or equivalent, shall be provided for all coolant and heater hoses. The maintenance-free clamps retain dynamic tension and never need retightening. These clamps stop leaks, even on out-of-round applications. The clamps are made from a heat sensitive thermoplastic with memory to prevent over or under tightening. The clamps shall have a temperature range of -40 degrees F to -302 degrees F.

AUXILIARY ENGINE COOLER

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

ALTERNATOR

The alternator shall be a Delco Remy or equivalent model 55SI 430 amp. The alternator shall be engine driven via a poly-groove power belt with an automatic tensioner. The alternator shall be a brushless design. The alternator shall meet all current applicable NFPA 1901 Edition requirements for performance.

BATTERY SYSTEM

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

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

BATTERY BOXES

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

SWITCH, MASTER BATTERY DISCONNECT

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

TOTAL SYSTEM LOAD MANAGER W/HIGH IDLE

The apparatus shall be equipped with a Class 1 Total System Manager (TSM) or equivalent for performing electrical load management. The TSM shall have two-(2) modes of operation, a "Calling Right of Way" and a "Blocking Right of Way". The "Blocking Right of Way" mode is activated only when the park brake is set. Load shedding shall "only" occur when the apparatus is in the "Blocking Right of Way" mode or when the battery voltage level reaches your programmed shed level.

Outputs 1-12 shall be independently programmable to sequence on with the ignition or master warning switch. Outputs 1-12 shall also be programmable to be activated during the "Calling Right of Way" mode and or the "Blocking Right of Way" mode. Output 13 is user configurable output and is programmable for activating between 10.5 and 15 volts. Output 14 shall provide a low voltage warning for an isolated battery. Output 15 shall be designated to activate a fast idle system. Output 16 shall provide a low voltage alarm that activates at the NFPA required 11.8 volts.

The Total System Manager shall have an internal digital display to indicate systems voltage is in normal operation mode and indicates the output configuration during programmable mode.

The Total System Manager shall be protected against reverse polarity and shorted outputs, and be enclosed in a metal enclosure to enhance EMR/RFI protection.

TRANSMISSION

The chassis shall be equipped with an Allison or equivalent 3000 EVS automatic transmission. It shall have 4th gear operating controls and programmed for Fire Apparatus vocation. An electronic oil level indicator shall be provided as well as a diagnostic reader port connection. The transmission shall 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 shall be an overdrive ratio, permitting the vehicle to reach its top speed at the governed engine speed.

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

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

TRANSMISSION SHIFTER, PUSH BUTTON

The transmission shall be controlled by an Allison, or equivalent, push button shifter internally illuminated for night operation. The shifter shall be mounted on the dash to the right of the steering column. The transmission shall be capable of five-(5) speed operation.

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

DRIVELINES

The chassis shall be equipped with Neapco or equivalent 1710 series driveshaft with full round yokes and universal joints. The driveshaft tubing shall be a minimum of 4.00" diameter with .134" wall thickness. The drivelines shall be balanced at a minimum of 3000 RPM.

FIRE PUMP MOUNTING

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

FUEL TANK

The chassis shall be equipped with a 50-gallon rear mounted fuel tank. The tank shall be constructed of 12-gauge steel with stainless steel mounting straps and rubber isolators secured to the bottom flange of the chassis framerails. The tank shall be baffled to prevent sloshing, vented, and have a drain plug installed on the bottom. A 240-33 ohm fuel-sending unit shall be provided and broadcast across the SAE J1939 data link.

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

FUEL LINES

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

FUEL SHUTOFF VALVE

One (1) fuel shutoff valve shall be installed in the suction side of the fuel lines near the fuel filters to prevent the loss of prime during fuel filter maintenance.

FUEL FILTER, SECONDARY

The Cummins engine or equivalent shall be supplied with a secondary fuel filter mounted to the engine.

FUEL/WATER SEPARATOR, PRIMARY FILTER

The Cummins ISL engine or equivalent shall be supplied with a 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.

UREA STORAGE TANK

There shall be a 5-gallon urea tank located under the extended portion on the cab. A urea level gauge shall be provided in the cab on the main instrument panel.

There shall be a DEF fuel fill assembly mounted in the left crew cab extension. The fill assembly shall have cast aluminum door and fuel fill cap with retention ring. The assembly shall be properly labeled "DIESEL EXHAUST FLUID ONLY".

EXHAUST SYSTEM

The apparatus shall contain a particulate filter and SCR (Selective Catalytic Reduction) device downstream of the engine's turbo. This filter and SCR device are required to maintain US 2013 EPA Emissions. 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.

An indicator light panel for this system shall 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 momentary switch labeled "Regen" shall be located within reach of the driver's seated position. The regeneration switch initiates the forced regeneration. A momentary DPF inhibit switch 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 shall 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 shall this feature affect the RPM of the engine being controlled by the pump operator.

The engine exhaust system shall 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 shall be installed. The temperature mitigation device shall lower the temperature of the exhaust by combining ambient air with the exhaust gasses at the exhaust outlet.

CUSTOM CAB

The cab shall be an engine forward extended, medium four-door, (raised roof) full tilt. The cab shall be an "Open Interior" roll cage design requiring no inner walls or vertical interior supports. The cab roof shall be raised 8 inches providing additional headroom above the crew area. The raised portion shall start midway over the driver and officer seats. The cabs seating capacity for emergency personnel shall be four with compartment space for EMS equipment.

All storage areas inside the cab shall fully comply with NFPA 1901 restraint requirements of 9G’s.

CRASH TEST

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

The cab shall have a frontal impact tests 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 shall be a minimum of 18.2 mph. The cab doors shall be closed during the impact test but be able to open after impact. There shall be no passenger intrusions or any structural component failures. The cab shall meet or exceed all criteria of this portion of the test.

In conjunction with the frontal impact test, a vertical load test shall be implemented to the cab. The cab roof shall be loaded with a minimum of 65,979 lbs. (29.53 metric tons). There shall 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 shall meet or exceed all criteria of this portion of the test.

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

CAB MATERIALS

The cab shall 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 shall be made of custom extrusions designed specifically for this cab with slots for inserting the skin. The rear wall and roof shall be reinforced with a grid of rectangular extrusions, which are welded to the overall cab extrusion framework. The front corner caps shall 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 APPROXIMATE DIMENSIONS

- Overall width skin to skin: 95 inches
- Overall vehicle width: 115 inches (w/standard mirrors)
- Overall length: 135 inches
- Cab Height Front: 85 inches
- Cab Height Rear: 95 inches
- Center of front axle to back of cab: 60 inches
- Windshield area: 4100 square inches
- Front grill opening: 430 square inches
- Side grill opening: 105 square inches
- Cab full tilt angle: 45 degrees
- Cab full tilt height: 185 inches
- Floor to ceiling in front: 60 inches
- Floor to ceiling in rear: 65 inches
- Engine cover height: not to exceed 27" front-to-back and side-to-side
- The Driver shall have no less than 24" of hip room
- The Officer shall have no less than 23" of hip room

DOUBLE WALL CAB FACE

The cab front shall be of double wall construction resulting in a sealed firewall. The inner and outer shall both be formed with 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 shall be treated with a heavy black undercoating material for corrosion prevention.

SEALED ENGINE TUNNEL

The engine tunnel shall be a structural part of the passenger cab, constructed from welded aluminum plate and reinforced with aluminum extrusions. The rear of the engine tunnel shall be no less than 57” inches from the rear wall of the cab, allowing maximum legroom for forward facing passenger. After welding, the seams shall 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 shall be insulated with 1” thick foil backed insulating foam, attached with stud and button method. A cross-section analysis of the insulation shall reveal a 1/8” thick barrier material for additional noise and heat insulation.

CAB FLOORS

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

The entire rear floor of the cab, to reduce trip and fall hazards, shall 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 shall 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 shall not be accepted.

CAB CORROSION PROTECTION

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

WHEEL WELL LINERS

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

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

FENDERETTES

Bright polished stainless steel fenderettes shall be installed at the wheel well openings. A rubber gasket shall be installed between the fenderette and cab to eliminate contact of dissimilar metals.

WINDSHIELD

The windshield shall have approximately 4100 square inches of unobstructed viewing area. It shall be a two-(2) piece design with tinted automotive safety glass, with a wraparound design. A .030-inch thick vinyl layer shall separate the laminated glass.

All other cab glass shall be tinted and tempered.

INTERMITTENT WINDSHIELD WIPERS

Two electric "Pantograph" style or equivalent windshield wipers shall be installed on the front face of the cab. The motors shall 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 shall be mounted a latched door recessed in the officer's step.

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

EXTERIOR GRAB HANDLES

Stainless steel handrails with a knurled, slip-resistant finish shall be positioned behind each cab door. Grab rails shall be minimum 24” in length. Molded rubber gasket shall be mounted between the grab handles and the cab in order to prevent corrosion due to dissimilar metals being in contract.

EXTREME DUTY CAB INTERIOR

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

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

The back side of the engine cover, as well as a 2” to 3” return on the top side, shall 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 shall have a custom built, smooth aluminum plate dashboard, overhead console, glove box, instrumentation panel and switch panel. The front overhead shall include room for the three sun visors and the door open indicator light.

The front door posts shall 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 shall be covered with a ruggedized paint finish.

Prior to installing the headliner and rear wall panel, minimum insulation, shall 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 shall be of a stationary, fixed design that use no moving parts and requires no periodic maintenance other than cleaning.

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

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

CAB STEP HEIGHTS

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

The distance from first cab step to intermediate step shall be approximately 12 inches front and rear.

The distance from intermediate step to cab floor shall be approximately 9 inches in the front and 12 inches in the rear.

CAB DOORS

All cab doors shall be full length, designed to cover the step well area. Each cab door shall be flush type with a minimum opening of 85 degrees.

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

The rear doors shall be approximately 34" inches wide by 86" inches tall. The doors shall have a two-piece window, one operational and one fixed. The combined viewing area shall be no less than 905 square inches. The crew area windows shall have a dark tint.

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

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

DOOR HINGES

Each cab door shall be attached to the cab with two concealed automotive style hinges with restraining strap.

CAB DOOR LOCKS

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

CAB DOOR WINDOWS, ELECTRIC

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

FIXED CAB WINDOW, LEFT SIDE

A window of not less than approximately 16" wide by 33" high shall be installed in the left sidewall of the cab between the front and rear door. The glass shall be tempered, dark tinted and retained with one-piece triple locking rubber lacing.

FIXED CAB WINDOW, RIGHT SIDE

A window of not less than approximately 16" wide by 33" high shall be installed in the right sidewall of the cab between the front and rear door. The glass shall be tempered, dark tinted and retained with one-piece triple locking rubber lacing.

CAB TILT LOCK

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

The cab shall tilt 45 degrees by means of a pair of hydraulic cylinders driven by the electric pump. The tilt system geometry shall 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 shall automatically engage and act as a positive lock. The lock is released by a pull cable. The hydraulic cylinders shall 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 shall 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

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

CAB PAINT FINISH, SINGLE COLOR

The apparatus cab shall be painted with AkzoNobel Sikkens brand paint or equivalent. The paint process shall meet or exceed current state regulations concerning paint operations. Pollution control shall include measures to protect the atmosphere, water, and soil. Contractor shall, upon demand, provide evidence that the manufacturing facility is in compliance with State EPA rules and regulations.

The cab exterior shall have no mounted components prior to painting to assure full coverage of metal treatments and paint to the exterior surfaces. Cab doors and any hinged smooth-plate compartment doors shall be painted separately to assure proper paint coverage on cab, door jambs and door edges.

Paint process shall feature high solid BTLV products and be performed in the following steps: Corrosion Protection - all aluminum surfaces shall be treated with the AkzoNobel Sikkens LV 260 or equivalent Epoxy coating to provide superior corrosion resistance and excellent adhesion of the base coat.

AkzoNobel Sikkens Sealer/Primer BTLV or equivalent - acrylic urethane sealer/primer shall be applied to guarantee excellent gloss hold-out, chip resistance and a uniform base color.

AkzoNobel Sikkens High Solid BTLV650 (Base coat) or equivalent - a lead-free, chromate-free high solid polyurethane base coat shall be applied, providing excellent coverage and durability. A minimum of two-(2) coats shall be applied.

AkzoNobel Sikkens High Solid BTLV650 (Clear coat) or equivalent - high solid LV clear coat shall be applied as the final step in order to ensure full gloss and color retention and durability. A minimum of two-(2) coats shall be applied.

Any location where aluminum is penetrated after painting, for the purpose of mounting steps, hand rails, doors, lights, or other specified components shall be treated at the point of penetration with a corrosion inhibiting pre-treatment (ECK Corrosion Control). The pre-treatment shall 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 shall be individually treated with the corrosion inhibiting pre-treatment.

After the paint process is complete, the gloss rating of the unit shall be tested with a 60 degree gloss meter. Coating thickness shall be measured with a digital MIL gauge and the orange peel with a digital wave scan device.

PRIMARY/LOWER CAB PAINT FINISH

The primary/lower cab exterior shall have no mounted components prior to painting to assure full coverage of metal treatments.

These steps are followed as recommended by the paint manufacturer to provide a lasting and high quality gloss finish. All paint products shall be provided by DuPont.

PRIMARY/LOWER CAB PAINT COLOR/CODE

The primary/lower cab paint code shall be red FLNA 31979.

INTAKE GRILLE, RIGHT SIDE W/EMBER SEPARATOR

A right stainless steel grille shall be installed approximately 70" above ground level on the right side of the cab between the front and rear cab doors. The grille shall 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 shall 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 shall be notched to allow easy access without removing the cab handrail.

HEATED/REMOTE CAB MIRRORS

Two side-mounted Velvac model 713760 rear view mirrors or equivalent shall be installed with an 8" X 16" mirror head and a separate 6" x 6-1/2" parabolic mirror. The mirror head shall be heated and

remotely adjustable by the driver. The mirrors shall be aerodynamically designed to reduce wind buffeting and resultant vibration. The housings shall be polished stainless steel.

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

EXTERIOR TRIM, REAR CAB STEP WELL

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

TREAD PLATE BACK OF CAB

The entire back wall of the cab shall be covered with aluminum tread plate. The tread plate shall be coated with a rust inhibitor and fastened to the cab with stainless steel fasteners. A bead of caulking shall be applied to the perimeter of the tread plate.

CAB CORROSION PROTECTION AND SOUND DEADENING

The apparatus cab shall 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 shall 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 shall be cleaned, primed and sprayed with black ruggedized coating as a finish coat. This shall include any areas that are not normally visible after the cab is complete.

The entire cab interior shall be sprayed with a ruggedized coating, as described earlier in these specifications. It shall 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 shall be completely finish painted with DuPont paint or equivalent, as described later in these specifications. This shall include the areas under any optional rear wall or cab roof diamond plate overlays.

The fire department shall, through the Virtual Manufacturing feature described earlier in these specifications, have the ability to see these areas covered with a ruggedized coating 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 shall be provided to the fire department.

INTERIOR CAB FINISH

The interior of the cab shall be painted with a dark gray ruggedized coating. The cab metal finish shall be covered with a coat of adhesion promoting primer.

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

FLOOR MATS/ENGINE TUNNEL COVERING

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

INTERIOR TRIM, REAR WALL ALUMINUM PANAL

The entire interior rear wall of the cab shall be covered with smooth aluminum plate coated with a ruggedized coating.

The color of the rear wall panel shall match the interior of the cab unless otherwise specified.

CAB GRAB HANDLES, INTERIOR

Two-(2) interior grab handles installed in the cab on the "A" posts, one-(1) each side. The grab handles shall 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. The grab handles shall be constructed of 1-1/4" knurled stainless steel. The gab rails shall be mounted with chrome plated end stanchions.

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

GLOVE BOX

The glove box shall be an integral part of the welded aluminum dashboard assembly and located on the officer side of the cab. The storage area of the glove box shall bolt in place for easy service access. The door shall be drop down style and constructed from brushed stainless steel with a recessed latch. The area above the glove box shall be flat for a work surface or optional MDT mounting.

SUN VISORS

The cab shall be equipped with three-(3) sun visors. The visors shall be installed on the overhead panel and provide approximately 90 percent coverage across the width of the cab. The visors shall be approximately 26" wide and 6" tall.

UPPER DOOR PANELS, INTERIOR

There shall be four-(4) interior upper front and rear door panels installed covered with a ruggedized coating extending from the window down to the lower kick plate. The color of the panels shall match the interior of the cab unless otherwise specified.

LOWER DOOR PANELS, INTERIOR

There shall be four-(4) interior lower front and rear door panels installed covered with a ruggedized coating extending from the window down to the lower kick plate. The color of the panels shall match the interior of the cab unless otherwise specified.

REFLECTIVE STOP SIGNS

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

INSTRUMENTATION

For easy viewing, gauges shall be white faced with black lettering and adjustable intensity LED backlighting. The gauges driver shall meet SAE J-1939 protocol to eliminate redundant sending units. The gauge crystal shall be flat glass with rubber o-ring seal. The panels shall be divided into groups of instruments that make identification sensible and easy to view.

The following instruments shall 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.

Center-
-Driver information display panel with alarm output for gauge warning lights
-Dial type transmission temperature gauge with warning light
-Panel light dimmer control knob
-Dial 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 dial type secondary air pressure gauge with warning light.

The following indicator lights shall 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, engine, transmission, and ABS

The lower dash to the left of the steering column shall contain the ignition, start and headlight switches. When a multiplexed electrical system is used with a display screen the headlight switch will be located in this screen.

The lower dash to the right of the steering column shall contain the regeneration and traction control switches.

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

SERVICE ACCESS

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

The chassis electrical panel shall be located in the center of the aluminum dash, between the switch panel and the windshield. There shall be a lift up cover, with two-(2) recessed lift-and-turn latches for quick access to the panel. The underside of the panel shall have a pre-printed diagram that clearly depicts the function of each circuit breaker and relay. The vehicle load manager shall be located in this panel. The opening to the electrical shall measure approximately 15" wide near the switch panel and 37" wide toward the windshield.

DRIVER'S INFORMATION DISPLAY

There shall 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 powertrain 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 powertrain 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

CHASSIS ELECTRICAL SYSTEM

The chassis shall include a single starting electrical system which shall include a 12 volt direct current system, suppressed per SAE J551. The wiring shall be appropriate gauge cross link with 311 degree Fahrenheit insulation. All SAE wires in the chassis shall be color coded and shall include the circuit number and function where possible. The wiring shall be protected by 257 degree Fahrenheit minimum high temperature flame retardant loom.

CHASSIS COLOR CODED WIRING

All chassis wiring shall be type in accordance with S.A.E. J1128 and NFPA-1901. ALL wiring shall be **COLOR CODED** and continuously marked with the circuit number and function.

A battery "loop back" ground circuit shall be supplied for the EDS system to reduce the possible effects of Electromagnetic and Radio Frequency Interference.

The chassis cab, engine and transmission shall be electrically bonded to the chassis frame rails with braided ground straps.

MAIN CENTER DASH

The main center dash area shall 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. The center panel shall be within comfortable reach of both the driver and officer. The panel shall be constructed of 5052-H32 Marine Grade, 1/8 inch thick aluminum plate.

SWITCH PANEL, DRIVER'S SIDE

The driver's side panel shall be constructed of Marine Grade, aluminum plate. The dash panel shall include the following:

The left side of the panel shall have nine-(9) switch positions, five-(5) upper and four-(4) lower. The upper positions shall be ENGINE BRAKE control (lighted rocker switch), ENG BRK LEVEL control (non-lighted rocker switch), DEFOG control (lighted rocker switch), HEAT/OFF/AC control (non-lighted rocker switch) and BLOWER SPEEDS control (non-lighted rocker switch). The lower positions shall be SPARE (lighted rocker switch), SPARE (non-lighted rocker switch), MIRROR HEAT control (lighted rocker switch) and MIRROR CONTROL (joystick type).

The center of the panel shall house the pump shift control.

The right side of the panel shall house the transmission shifter, OK TO PUMP green light and PUMP ENGAGED green light.

SWITCH PANEL, CENTER

The center panel shall be constructed of Marine Grade, aluminum plate. The dash panel shall include the following:

The left side of the panel shall have eight-(8) switch positions, four-(4) upper and four-(4) lower. The upper positions shall be EMERGENCY MASTER control (lighted rocker switch), LIGHTBAR control (lighted rocker switch), FRONT WARNING control (lighted rocker switch) and SIDE WARNING control (lighted rocker switch). The lower positions shall have four-(4) BLANK panels.

The center of the panel shall house the electric siren control head in the upper portion and parking brake control in the lower portion.

The right side of the panel shall have eight-(8) switch positions, four-(4) upper and four-(4) lower. The upper positions shall be REAR WARNING control (lighted rocker switch), COMPARTMENT LIGHT control (lighted rocker switch), WORK LIGHT control (lighted rocker switch) and SPARE (lighted rocker switch). The lower positions shall have four-(4) BLANK panels.

SWITCH PANEL, OFFICER'S SIDE

The officer's side panel shall be constructed of Marine Grade, aluminum plate. The dash panel shall include the following:

The panel shall be blank.

VEHICLE DATA RECORDER

Apparatus shall be equipped with a Class1 or equivalent “Vehicle Data Recorder and Seat Belt Warning System” (VDR/SBW) that is connected to the power train CAN (Controller Area Network) bus consisting of transmission (TCM), engine control (ECM) and antilock brake (ABS) modules mounted on the apparatus. The VDR/SBW will function per NFPA 1901-2009 sections 4.11 (Vehicle Data Recorder) utilizing the power train’s J1939 data and 14.1.3.10 (Seat Belt Warning) using the Class1 “Seat Belt Input Module” for seat occupied and belt status information.

The VDR data shall be downloadable by USB cable to a computer using either Microsoft™ or Apple™ Operating Systems using Class 1/ O.E.M. supplied reporting software.

There shall be a seat belt indicator system supplied in the cab. The indicator system shall indicate seat belt use for each individual seating position when the seat is occupied, the seat belt remains unfastened and the parking brake is released.

A display panel shall be supplied in the dash area. The panel shall have an audible indicators and a red light display to indicate that a seat belt has not been fastened.

SEAT BELT WARNING SYSTEM

Mounted in the overhead console in the driver's area the indicator system shall indicate seat belt use for each individual seating position when the seat is occupied, the seat belt remains unfastened and the parking brake is released.

STEERING COLUMN

The steering column shall be a Douglas Autotec tilt and telescope or equivalent. A lever mounted on the side of the column shall control the tilt and telescope features. A Signal-Stat (self-canceling) turn signal switch shall be mounted to the column. The steering shaft from the column to the meter box shall 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 shall be 18 inches in diameter.

The Signal-Stat turn signal switch shall 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

HEATING/AIR CONDITIONING SYSTEM

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

The front circuits shall 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 shall blow up toward the windshield through adjustable vents in the dash. Additionally, there shall be two-(2) adjustable vents each side to direct air at the lower portion of the driver and officer seating areas. Two switches, including low/med/high and heat/off/ ac, shall control the front system.

A blend air switch shall be installed to operate both the front heating and cooling systems. This provides hot and dry air for defogging purposes.

The two front systems shall combine to put out a total of 688 CFM air flow.

The rear circuit shall use one large heater-air conditioner unit with a rating of 34,150 BTU cooling and 36,000 BTU heating. It shall be mounted under the forward facing rear seats. Ducting shall 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 shall control the unit. In addition to the rear control switches, there shall be an ON/OFF switch located near the driver to disable the rear unit if needed.

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

The total system shall 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 shall be heavily insulated with 1" foam to enhance the cooling system.

Both heaters shall be plumbed with a shut off valve at the engine.

The air conditioning system shall be powered through two-(2) engine driven 9-1/2cubic inch compressors.

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

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

SEAT MATERIAL

The seats shall be covered with Durawear material or equivalent.

SEAT COLOR

The cab seats shall be gray in color.

DRIVER'S SEAT

The driver's seat shall be a Bostrom or equivalent Model Sierra high-back with air ride suspension. The seat shall have 4-way adjustability by the driver in accordance with SAE J1517. The seat shall be equipped with an integrated 3-point seat belt with an automatic retractor. The belt shall be red in color to meet current NFPA requirements.

OFFICER'S SEAT

The officer's seat shall be a Bostrom or equivalent Tanker 450 SCBA non-suspension. Seat back shall include a spring-loaded flip-up headrest. The seat shall be equipped with 3-point shoulder harness with lap belt and an automatic retractor built into the seat assembly. The belt shall be red in color to meet current NFPA requirements.

There shall be a SecureAll auto lock SCBA holder provided with the seat. The SCBA holder shall have an integrated one-touch release handle located centered in the seat cushion. The SecureAll system meets NFPA 1901 standards and requirements of EN 1846-2.

There shall one-(1) SCBA seat cavity removable panel provided for a smooth back when the breathing air apparatus is not in use.

CREW SEAT, DRIVER'S SIDE REAR FACING

One-(1) outboard, rear facing, seat shall be installed behind the driver. The seat shall be Bostrom or equivalent Tanker 450 SCBA non-suspension seat. The seat back shall include spring-loaded flip-up headrest. The seat shall be equipped with 3-point seat belt with automatic retractor. The belt shall be red in color to meet current NFPA requirements.

There shall be a SecureAll auto lock SCBA holder provided with the seat. The SCBA holder shall have an integrated one-touch release handle located centered in the seat cushion. The SecureAll system meets NFPA 1901 standards and requirements of EN 1846-2.

There shall be one-(1) SCBA seat cavity removable panel provided for a smooth back when the breathing air apparatus is not in use.

CREW SEAT, OFFICER'S SIDE REAR FACING

One-(1) outboard, rear facing, seat shall be installed behind the officer. The seat shall be Bostrom or equivalent Tanker 450 SCBA non-suspension seat. The seat shall include a spring-loaded flip-up headrest. The seat shall be equipped with a 3-point seat belt. The belt shall be red in color to meet current NFPA requirements.

There shall be a SecureAll or equivalent auto lock SCBA holder provided with the seat. The SCBA holder shall have an integrated one-touch release handle located centered in the seat cushion. The SecureAll system meets NFPA 1901 standards and requirements of EN 1846-2.

There shall one-(1) SCBA seat cavity removable panel provided for a smooth back when the breathing air apparatus is not in use.

COMPARTMENT, CENTER FORWARD FACING

One-(1) EMS compartment constructed of 1/8" smooth aluminum shall be mounted in the cab. The compartment shall be approximately 40”W x 40”H and as deep as practical. This cabinet shall be installed on the back wall replacing the two center forward facing seats. The cabinet shall be finished with a spray on polyurethane liner, color to match the interior.

EMS COMPARTMENT NETTING

Cargo netting shall be installed over the interior opening of the EMS compartment. The netting shall be permanently fixed at the bottom of the compartment with self-locking seat belt latches at the top and sides.

EMS COMPARTMENT LIGHT

There shall be one (1) 36" OnScene Solutions or equivalent "Night Stik" Access model 73036 shall be installed in the EMS compartment. The light shall provide 15HB of surface mounted LED'S per 10" sections and produce a minimum of 200 lumens per 10" of length.

SHELF, EMS COMPARTMENT

There shall be one (1) vertically adjustable shelf shall be installed in the EMS cabinet. The shelf shall be constructed of smooth aluminum and have a 2" lip at the front, sides and rear of the shelf.

12V POWER OUTLET, EMS COMPARTMENT

There shall be One (1) 12-volt cigar lighter style power supply installed in the EMS compartment.

CHARGING PORT, 12-VOLT DUAL USB

There shall be one (1) Kussmaul or equivalent model 019-219-4, 12-volt USB dual charging port provided in the cab. The charging port shall be equipped with two-(2) 2.1 amp connections with built in LED indicator that indicates when the device are powered.

The charging port shall be wired to direct battery power with the appropriate wire size and fuse.

The charging port shall be located in the emergency switch panel or another location to be determined later.

POWER AND GROUND STUDS

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

12-VOLT POWER OUTLETS

There shall be two (2) 12-volt power outlets provided in the cab.

The power outlets shall be wired to direct battery power with the appropriate wire size and fuse.

ELECTRONIC SIREN

There shall be one-(1) Whelen or equivalent model 295HFS2 hands free siren control head mounted in the cab. The 295HFS2 shall incorporate a 12V/200W remote siren amplifier on an aluminum alloy chassis covered by an aluminum alloy housing with a powder coated black top for maximum protection. The 295HFS2 shall be furnished with a flush mount black polycarbonate powder coated control head. The 295HFS2 shall have the ability for either 100 or 200 watt output. The front overlay of the control head shall be made of a black polycarbonate and powder coated. The lettering and artwork on the overlay shall be illuminated with adjustable backlighting of soft LED non-glaring green. The control head operating controls will consist of a power switch, manual button, and a function rotary switch. The control head shall include a 20A/32V fuse. The microphone shall be hardwired to the 295HFS2. The 295HFS2 PC board shall have input polarity protection, output short circuit protection. The solid state siren speaker amplifier shall be vibration resistant.

The 295HFS2 shall have four Scan-Lock™ siren tones with two manual functions for additional siren tones. The siren amplifier shall have the ability to customize the placement of each siren tone with the rotary switch. The siren amplifier shall have a “Siren in Use” icon driver and adjustable preset repeat radio volume. The PTT (push to talk) switch on the microphone shall override all siren functions. The 295HFS2 shall have a combination On/Off and horn ring transfer switch with Bi-polarity horn/ring activation control. The 295HFS2 shall have SI Test® capability to perform a complete diagnostic silent test of amplifier and speaker(s). The siren amplifier shall have a quick disconnect plug. The 295HFS2 shall have the ability to activate siren tones with “Aux Enable” input either with a slide switch, power controls, or relay-to-ground connector. The 295HFS2 shall meet Class A requirement for SAE, AMECA, KKK1822, and California Title XII. The sire amplifier shall include stainless steel hardware for installation. The 295HFS2 is covered by a five year factory warranty.

HORN, ELECTRIC

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

BACK-UP ALARM

There shall be one-(1) Whelen or equivalent model WBUA107, 107 dB, electronic back-up alarm installed at the rear of the apparatus. The alarm shall be wired to the transmissions output signal and is automatically activated when the transmission is shifted into reverse.

LIGHTS, CAB DOME

Four-(4) Whelen or equivalent 6" Round Super-LED model 60CREGCS shall be provided in the cabs headliner. The steady burn 12v interior light shall 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 shall provide extended life/luster protection against UV and chemical stresses. The conformal coated PC board and foam in place gasket shall 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 shall be vibration resistant. The interior light is covered by a five year factory warranty

The white LED lights shall 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.

LIGHT, DOOR AJAR

A red door ajar flashing light, Whelen or equivalent OS Series LED shall be mounted on the driver's side face of the overhead panel. A chrome flange is to be supplied with the light.

This light is wired with a flasher to the power panel for completion to circuit on the body.

The light circuit shall be wired so that the light circuit is deactivated when the parking brakes of the apparatus are applied.

A label shall be applied adjacent to the light 'DOOR OPEN'.

LIGHTS, STEP WELL

Six-(6) TecNiq or equivalent D04 Linear Dragon LED lights shall be provided, two-(2) in each front cab step well and one-(1) in each rear cab step well. Each light shall activate when the cab door in opened.

LIGHTS, ENGINE MAINTENANCE

Two-(2) white 4" LED round lights shall be mounted under the cab. The lights shall automatically activate when the cab is tilted.

FRONT LIGHTING

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

HEADLIGHTS

Four-(4) halogen rectangular headlights shall be installed in the warning light modules, two-(2) each side. The headlights shall be mounted in the upper positions of the module.

TURN SIGNALS, FRONT

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

turn arrow light shall incorporate 92 amber 5mm-LED and a clear non-optic hard coated polycarbonate lens. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The encapsulated 5 mm-LED populated arrow shaped PC board and foam in place gasket shall provide additional protection against environmental elements. The solid state turn arrow light shall be vibration resistant. The light shall have 6 Scan-Lock™ flash patterns including steady burn default. The turn arrow light is FMVSS108 certified. An installation kit including mounting hardware and rubber gasket shall be provided for surface mounting. The 60A00TAR will contain a 12" non-terminated pigtail. The turn arrow light is covered by a five year factory warranty.

LIGHTS, TURN SIGNAL/MARKER

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

LIGHTS, LED CORNING

Two-(2) Whelen or equivalent 400 series model 40R02Z*R flashing LED cornering lights shall be mounted, one-(1) each side below the marker lights in the warning light module. The lights shall 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 shall 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 shall 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 shall provide additional protection against environmental elements. The solid state warning lights shall be vibration resistant. The self-contained flashing light shall have 25 Scan-Lock™ flash patterns including synchronize feature and steady burn. An installation kit including mounting hardware and rubber gasket shall 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 shall be five-(5) Whelen or equivalent 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 or equivalent 600 Series Super-LED model 60R02FRR shall be installed, one-(1) each side inboard of the turn signal in the warning light modules. The warning light shall incorporate red Linear Super-LEDs, a red optic hard coated polycarbonate lens, and utilize a metalized reflector with integrated TIR hybrid optics for maximum output. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The encapsulated lens/reflector assembly and conformal coated PC board shall provide additional protection against environmental elements. The solid state warning lights shall be vibration resistant. The self-contained flashing light shall have 14 Scan-Lock flash patterns including synchronize feature and steady burn. The warning light is covered by a five year factory warranty.

LIGHTS, CAB GROUND

There shall be one-(1) Whelen or equivalent 2G Series model 20C0CDCD 4" LED light mounted under each cab door illuminating the area below providing a safe entrance and exit for cab occupants. All cab ground lights shall automatically activate when any cab door is opened and by a switch located on the dash.

The 12v steady burn light(s) shall incorporate 12 clear LED and a clear optic hard coated polycarbonate lens. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The encapsulated coated PC board and lens fitted with foam in place gasket assembly shall provide additional protection against environmental elements. The solid state light shall be vibration resistant. The 20C0CDCD will contain 350 usable lumens. An installation kit including

mounting hardware and rubber gasket shall be provided. The 20C0CDCD will contain a 12" terminated pigtail with a waterproof Deutsch® connector. The light is covered by a five year factory warranty.

FRONT BUMPER

There shall be an 80,000 psi high tensile strength painted steel bumper provided fabricated from approximately 10” x 3” x .375 steel channel bolted to the chassis frame rails utilizing grade 8 hardware protecting the front of the apparatus during head-on or angled collisions.

RECESSED BUMPER POCKETS

The front bumper ends shall have recessed pockets to allow for mounting of warning lights.

GRAVELSHIELD

A gravelshield constructed of approximately 1/8" (.125") embossed aluminum tread plate shall be installed above the frame extension between the bumper and the front face of the cab.

BUMPER COMPARTMENT, DRIVER'S SIDE

There shall be a compartment provided in the front bumper gravelshield, driver's side fabricated of 1/8" (.125) smooth aluminum plate with drain holes to promote airflow.

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

BUMPER COMPARTMENT, CENTER

There shall be a compartment provided in the front bumper gravelshield, centered between the frame rails fabricated of approximately 1/8" (.125) smooth aluminum plate with drain holes to promote airflow.

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

BUMPER COMPARTMENT, OFFICER'S SIDE

There shall be a compartment provided in the front bumper gravelshield, passenger's side fabricated of approximately 1/8" (.125) smooth aluminum plate with drain holes to promote airflow.

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

COVER, FRONT BUMPER COMPARTMENT

One (1) full length, hinged, aluminum tread plate cover shall be installed over front bumper. The cover shall be secured in the closed position with two-(2) stainless steel latches. The cover shall be raised for additional storage.

RECEIVER HITCH, BELOW FRONT BUMPER

One-(1) Class 4 receiver hitch shall be installed below the front bumper centered between the frame rails utilizing grade eight bolts.

There shall be one-(1) 12v Quick Connect, battery powered lead, wired to the chassis electrical system to supply a portable winch. The connector shall be located at the receiver location.
A safety sign FAMA28, shall be located on or near the receiver or anchor stating the maximum straight line pull rating.

A warning label permanently affixed in close proximity of the receiver shall be installed stating manufacturers suggested maximum load rating.

RECEIVER HITCHES, LEFT/RIGHT/REAR OF BODY

Three-(3) Class 4 receiver hitches shall be installed, one-(1) each side below the left and right side rear body compartments and one-(1) below the rear step utilizing grade eight bolts.

A safety sign FAMA28, shall be located on or near each receiver or anchor stating the maximum straight line pull rating.

A warning label permanently affixed in close proximity of the receiver shall be installed stating manufacturers suggested maximum load rating.

12 VOLT WINCH QUICK CONNECTS

There shall be three-(3) 12v Quick Connect, battery powered leads, wired to the chassis electrical system to supply a portable winch. The connectors shall be located one-(1) each at the receiver locations.

MECHNICAL SIREN

One (1) Federal Signal or equivalent Q2B siren model Q2B-012NNSD electro-mechanical siren shall be installed thru the front bumper, driver's side outboard. The Q2B siren shall be a streamlined, chrome plated siren designed to provide reliable and long-life operation. The electro-mechanical siren shall produce the distinctive Q2B sound that is a registered trademark of Federal Signal, and shall be provided with a heavy duty clutch and an electric brake.

The Q2B siren shall measure 10.5” high x 14” long x 10” deep and shall produce 123 decibels at ten feet. The siren shall operate off the vehicles 12V system. The Q2B siren shall be recess mounted in the front of the vehicle.

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

SIREN WIRING

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

SIREN FOOT SWITCHES

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

AIR HORN, PASSENGER'S SIDE

There shall be one-(1) 24" long Grover air horn installed in compliance with NFPA thru the front bumper, passenger's side, outboard of the frame rail. The air horn shall be plumbed to the chassis, air supply system thru an air protection valve, and manufactured from spun brass material with an easily separated die cast sounding unit for serviceability.

AIR HORN, DRIVER'S SIDE

There shall be one-(1) 24" long Grover air horn or equivalent installed in compliance with NFPA thru the front bumper, driver's side, ouboard of the frame rail. The air horn shall be plumbed to the chassis, air supply system thru an air protection valve, and manufactured from spun brass material with an easily separated die cast sounding unit for serviceability.

AIR HORN FOOT SWITCHES

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

SPEAKER, PASSENGER'S SIDE

There shall be one-(1) speaker shall be installed thru the front face of the bumper, passenger side, outboard.

The speaker shall be a Cast Products SA2401, 100-watts wired to the electronic siren.

TIRE CHAINS, AUTOMATIC

The rear axle shall be equipped with an ON-SPOT or equivalent automatic tire chain system. The system shall provide instant traction at the touch of a switch, without having to stop the vehicle.

The driver's dash shall have an electric control switch, clearly labeled for operation of the tire chains. The switch shall be provided with a guard to prevent accidental deployment of the tire chains. The switch when activated shall open a frame mounted solenoid, allowing air from the chassis air system to enter the spring loaded air cylinder and lower the chain wheel. The rubber covered chain wheel shall contact the inside of the tire causing the chain wheel to rotate and deploy the chains. The ON-SPOT automatic chains shall have six-(6) lengths of chain, spaced at 60-degree intervals on the chain wheel, ensuring two chains between the tire and road surface for instant traction in slippery conditions whether accelerating, braking, or in a wheel lock up condition. The ON-SPOT chains can be activated with speeds of 2 MPH to 25 MPH. The ON-SPOT chains shall be operable in either forward or reverse for speeds up to 35 MPH.

When the chains are no longer needed the process is reversed, the dash board switch is turned of and the air is exhausted from the cylinder. The return springs in the air cylinder brings the chain wheels back to their resting position.

BATTERY CHARGER

A Kussmaul or equivalent Auto Charge 1200 series model 091-187-12-Remote shall be mounted in the vehicle to maintain the chassis electrical system.

The onboard automatic battery charger shall sense battery voltage drop and recharge the batteries to full capacity. The state of charge shall be indicated by the bar graph located on the front of the unit.

The charger shall have the following operational specifications:

Input:	120 volts, 60 Hz, 10 amps
Output:	12 volts DC, 40 Amps
Input Fuse:	15 amps, Fast Acting
Voltage Sense:	Remote Electronic

The battery charger shall supply a ‘single battery bank’ with automatic operation and with an aluminum enclosure. The system shall have a built-in sense circuit to check battery voltage 120 times a second; the system shall compensate for voltage drop in charging wires and provide quick recharging with no overcharging. The unit shall include front panel connections for a remote display.

SUPER AUTO-EJECT, 20 AMP

There shall be provided one (1) super auto-eject type receptacle model 091-55-20. A solenoid wired to the vehicle starter is energized when the engine is started. This instantaneously drives the plug from the receptacle. The receptacle shall be provided with a weatherproof cover. The cover shall be spring loaded to close, preventing water from entering when the shoreline is not connected. The super auto eject receptacle shall 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 shall draw a continuous load or intermittent load.

The Auto Eject cover shall be a Kussmaul 091-55RD, red in color.

DISPLAY, BAR GRAPH

The charger shall include a model 091-199-001 remote digital display.

SHORE POWER INLET PLATE

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

The plate shall indicate the following:

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

LIGHTED CUSTOM FRONT GRILLE

The front grille shall be a cast aluminum assembly with 430 square inches of open area. The grille shall be backed with an aluminum honeycomb mesh to protect the radiator. The front grille shall be personalized that reads **SOMERSET** with backlit LED lights activated by the battery on/off switch.

EQUIPMENT MOUNTING PLATE, ENGINE TUNNEL

There shall be one-(1) equipment mounting plate installed on the engine tunnel with 45-degree bends on the driver and officer sides constructed of 3/16" smooth aluminum plate covered with a ruggedized coating.

PAC-TRAC TOOL BOARDS

Two (2) Pac-Trac or equivalent tool boards shall be installed in the cab for the mounting of additional equipment. The tool board slats shall be provided with Trac Lock inserts and fasteners.

STORAGE POCKETS, VERTICAL TOOL BOARD

There shall be one (2) 6" deep storage pockets installed at the bottom of the cab mounted tool boards.

12-VOLT FUSE BLOCK

There shall be one (1) Blue Sea or equivalent fuse block 5025 installed in a location determined by the customer. The unit shall include a six-(6) 12 volt constant power supply ports and grounding buss with easily changeable fuses. The unit shall have a 100 amp total operating range.

MAP BOOK HOLDER

A map book holder shall be installed in the cab as directed by the Fire Department. The map book holder shall be constructed of smooth aluminum with a Velcro retaining strap. The map book holder shall be painted to match the interior color of the cab.

RADIO ANTENNA MOUNT

There shall be one (1) standard antenna-mounting base, model MNO, with 17 feet of coax cable and weatherproof cap provided for a two (2)-way radio installation. The mount shall be located on the cab roof, just to the rear of the light bar. The cable shall be routed under the officer's seat.

RADIO POWER CIRCUIT

A 50 amp switched battery power circuit with manual reset shall be installed centered in the dash to

activate the radio.

BACK UP CAMERA SYSTEM

One-(1) Federal Signal or equivalent model CAMSET-70 color camera system shall be installed on the vehicle. The system shall be wired to the vehicles 12 volt electrical system. The 7" LCD color monitor shall be installed in cab in easy reach of the driver while in the seated position. The color camera shall be installed facing rearward giving a clear and unobstructed view behind the vehicle. The system shall activate when the transmission is shifted in the reverse position. A switch located on the monitor shall activate the system regardless of the transmissions shifted position.

This system shall consist of the following components:

- One 7" CAMLCD color monitor installed in the cab
- One color camera model CAMCCD-REARNTSC with night vision and audio installed high at the rear of the vehicle
- 65.5 feet of camera-to-monitor extension cable (CAMCABLE-20)
- Multiple camera control box (CAMBOX-4NTSC/CAMBOX-PAL)
- Mounting bracket and hardware (CAMLCD-BRACKET)

SAFETY SIGNS, GENERAL REQUIREMENTS

Safety signs with text shall conform to the general principles of ANSI/NEMA Z535.4, *Product Safety Signs and Labels*. Safety signs without text shall 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 shall employ safety signage that complies with ANSI/NEMA Z535.4.

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

Safety signs referenced in this standard beginning with the letters FAMA shall 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*.

SAFTEY SIGNS, BATTERY EXPLOSION

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

SAFTEY SIGNS, ROTATING SHAFTS

Safety signs FAMA02, shall be provided on each side of the frame rail and in any other location(s) where rotating shaft hazards are apparent. The label shall 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.

SAFTEY SIGNS, HOT SURFACES

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

SAFTEY SIGNS, HOT EXHAUST

A safety sign FAMA04, shall 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 shall also state precautions that should be taken while working on or around the surface.

SAFTEY SIGN, SPINNING FAN

A safety sign FAMA03, shall be provided on both sides of the engine fan. The label shall 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.

SAFTEY SIGNS, SEATED & BELTED

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

SAFTEY SIGN, AIR CONDITIONING REFRIGERANT

If the apparatus is equipped with any type of air conditioning system, a safety sign FAMA09, shall be provided that is located in an area that would be visible to service personnel. The label shall 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, shall be visible inside the cab.

SAFTEY SIGN, FIRE SERVICE TIRE RATING

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

SAFTEY SIGN, ELECTRONIC STABILITY CONTROL

If the apparatus is equipped with an electronic stability control system, a safety sign FAMA13, 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 shall 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 shall be located in the cab visible to the operator.

The sign shall read:
This vehicle has a seating capacity of 4 personnel.

Carrying additional personnel may result in death of serious injury.

SAFTEY SIGNS, HELMET WORN IN CAB

A safety sign FAMA15, which warns not to wear helmets while the vehicle is in motion, shall 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, shall 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 shall also warn of potential injury or death that be caused by failing to follow proper procedures.

SAFTEY SIGNS, INTAKE/DISCHARGE CAP PRESSURES

If the apparatus is equipped with a pump system system, safety signs FAMA18, shall be provided in all areas that intakes and discharges are capped. The label shall give instruction on how to properly remove the cap. The label shall 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, shall be visible to personnel at each hose storage area.

SAFETY SIGNS, CLIMBING METHOD INSTRUCTION

Safety signs FAMA23, which warns of the proper climbing method, shall 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, shall 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, shall be located on the pump operator's panel.

SAFETY SIGNS, NO-STEP

Safety signs FAMA26, shall 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 shall 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, shall be provided inside the driver's door warning of potential injury that could be received from the noise of the siren. The label shall also state safety precautions that should be taken when the siren is in use.

SAFETY SIGN, APPARATUS MOVEMENT

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

"DO NOT MOVE APPARATUS WHEN LIGHT IS ON".

PLATE, FLUID CAPACITY

A permanently affixed fluid date plate shall 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 shall 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 shall 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 shall be constructed of aluminum tubing, channel, angle, and break-formed components. The framework shall 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 shall be constructed of 3.00 x 3.50, 6063-T6 aluminum extrusions. The break-formed components shall be constructed from 3/16" (1.875) aluminum.

The crossmembers support the substructure and the exterior panels independently from the cab and body. The crossmembers shall be isolated from the frame rails using torsion mounts. The pump enclosure shall be supported at the top of the frame rails, in a minimum of four-(4) places. The module shall 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 shall be covered with aluminum tread plate to keep road debris from the front of the pump.

The pump enclosure provides an area above the pump for the installation of crosslays or dunnage area.

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

PUMP PANELS

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

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

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

All gauges and controls shall be properly identified with color-coded metal tags. The tags shall be affixed with 3M brand industrial adhesive. The gauges shall be functionally grouped above each control.

The right side upper panel shall be vertically hinged with double doors and push style latches for pump compartment access. The doors shall be constructed of .125" aluminum tread plate.

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

All instruments and controls shall be provided and installed as a group at the pump panel. The central midpoint or centerline of any valve control shall be no more than 72" vertically above the ground or platform that is designed to serve as the operator's standing position. The instruments shall 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, shall be located on the pump operator’s panel.

ENCLOSED PUMP MODULE

The pump module shall be an enclosed side mount with recessed fully enclosed control panels on each side of the module.

Roll-up doors shall be installed one-(1) each side providing access to the operator's control panel, speedlays, suction inlets and discharge outlets, protecting the controls from the buildup of dirt, road debris, or inclement weather.

The roll-up door slats shall be constructed of double-walled (box frame) aluminum extrusions or equivalent. Exterior surfaces shall be flat while the interior surfaces are concaved. The slats are anodized to eliminate oxidation with inner-locking end shoes on every slat secured by a Punch-Dimple process or equivalent. The slats shall also be interlocking with a folding locking flange. Between each slat shall be a PVC/vinyl inner seal to prevent any metal-to-metal contact.

The track shall be one-piece aluminum, which has an attaching flange and finishing flange incorporated into its design, providing a finished look to the installation without additional trim or caulking. The track shall have a replaceable side seal. The side seal shall prevent water and dust intrusion into the compartment.

There shall be an aluminum drip rail above each compartment door with a built in replaceable wiper seal.

Each roll up door shall have a counter balance to assist in lifting and eliminate the risk of accidental closing. A full width lift bar, operable by one hand, shall be used as a positive latching device securing each individual compartment door in the closed position. There shall be an anodized aluminum sill plate installed over the compartment door.

The pump enclosure's roll-up doors shall be painted job color.

FULLY HINGED PUMP PANEL, RIGHT SIDE

One-(1) vertically hinged pump panel with push style latch shall be installed and constructed of the same material as stated in the pump module specifications. The hinged panel replaces the current right hand lower removable panel for ease of access to the pump compartment during routine maintenance.

PUMP PANEL LIGHT, LEFT SIDE

One-(1) individual OnScene or equivalent Access LED pump panel light with on/off switch shall be mounted under the light shield left side. For optimum visibility during nighttime operations, the light shall be mounted as high as possible.

PUMP PANEL LIGHT, RIGHT SIDE

One-(1) individual OnScene or equivalent Access LED pump panel light with on/off switch shall be mounted under the light shield right side. For optimum visibility during nighttime operations, the light shall be mounted as high as possible.

LIGHTS, PUMP COMPARTMENT

One-(1) compartment light shall be installed in the pump compartment for inspection or routine maintenance wired to the pump panel light switch.

RUNNING BOARD, LEFT SIDE

A running board shall be provided on the left side of pump module constructed of approximate “Embossed” 3/16” (.1875) aluminum tread plate flanged down and in 2.50” x 1.00” for maximum rigidity then bolted to the modules substructure to facilitate removal.

The running board stepping surface shall comply with the latest version of NFPA 1901.

RUNNING BOARD, RIGHT SIDE

A running board shall be provided on the right side of pump module constructed of approximate “Embossed” 3/16” (.1875) aluminum tread plate flanged down and in 2.50” x 1.00” for maximum rigidity then bolted to the modules substructure to facilitate removal.

The running board stepping surface shall comply with the latest version of NFPA 1901.

PUMP OPERATOR'S PLATFORMS

Two (2) slide-out platforms shall be installed under the operator's panel constructed from 3/16” (.1875) aluminum tread plate. Two-(2) sealed roller bearing slides, with a total capacity of 500lbs shall 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 slide-out platform shall be wired to the open door indicator system activating the light in the cab when the step is in the extended position.

PRESSURE GOVERNOR and ENGINE MONITORING DISPLAY

Fire Research PumpBoss series PBA400-A00 pressure governor and monitoring display kit shall be installed. The kit shall include a control module, intake pressure sensor, discharge pressure sensor, and cables. The control module case shall be waterproof and have dimensions not to exceed 6 3/4" high by 4 5/8". The control knob shall be 2" in diameter with no mechanical stops, have a serrated grip, and a red idle push button in the center. It shall not extend more than 1 3/4" from the front of the control module. Inputs for monitored engine information shall be from a J1939 databus or independent sensors. Outputs for engine control shall be on the J1939 databus or engine specific wiring. Inputs from the pump discharge and intake pressure sensors shall be electrical.

The following continuous displays shall be provided:

Engine RPM; shown with four daylight bright LED digits more than 1/2" high
Check engine and stop engine warning LEDs
Engine oil pressure; shown on a dual color (green/red) LED bar graph display
Engine coolant temperature; shown on a dual color (green/red) LED bar graph display
Transmission Temperature: shown on a dual color (green/red) LED bar graph display
Battery voltage; shown on a dual color (green/red) LED bar graph display

Pressure and RPM operating mode LEDs
Pressure / RPM setting; shown on a dot matrix message display
Throttle ready LED.

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

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

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

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

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

The pressure governor and monitoring pressure display shall be programmed at installation for a specific engine.

MASTER GAUGES, 4-1/2"

Two compound 4-1/2" master gauges shall be provided and installed on the pump operator's panel. The intake and discharge gauges are liquid filled with a solution to assure visual readings and reduce inner lens condensation. The body of the gauges shall be constructed of Zytel nylon with chrome-plated bezels. The face of the gauges shall be Spun Metal with black background and white markings accurate within 1%.

The pressure gauges shall maintain performance of all features and be free from defects in material and workmanship which includes fluid fill leakage and discoloration for seven years.

PRESSURE GAUGES, 2-1/2"

The discharges shall be provided with 2-1/2" pressure gauges. The discharge gauges shall be liquid filled with a solution to assure visual readings and reduce inner lens condensation. The body of the gauges shall be constructed of Zytel nylon with chrome-plated bezels. The face of the gauges shall be Spun Metal with black background and white markings reading from zero to 400 PSI.

The gauges shall be installed at each discharge control on the pump operator's panel. On side mount pump applications with push pull handles each gauge shall incorporate a Thuemling Instrument Group 1-piece module assembly consisting of the gauge, push-pull and trim bezel.

The pressure gauges shall maintain performance of all features and be free from defects in material and workmanship which includes fluid fill leakage and discoloration for seven years.

GAUGE BEZELS, COLOR CODED

The pump panel master and pressure gauge bezels shall be color coded.

PUMP PANEL TAGS

All discharges, gauges, and controls will be properly identified by color-coded metal tags. The metal tags will be affixed with 3M industrial adhesive.

PUMP SYSTEM, HALE QMAX SINGLE STAGE OR EQUIVALENT

PUMP ASSEMBLY

The entire pump shall be cast, manufactured, and tested at the pump manufacturer's factory.

The pump shall be driven by a driveline from the truck transmission. The engine shall provide sufficient horsepower and RPM to enable pump to meet and exceed its rated performance.

The entire pump, both suction and discharge passages, shall be hydrostatically tested to a pressure of 600 PSI. The pump shall be fully tested at the pump manufacturer's factory to the performance specs as outlined by the latest NFPA Pamphlet No. 1901. The pump shall be free from objectionable pulsation and vibration.

The pump body and related parts shall be of fine grain, cast iron alloy, with a minimum tensile strength of 30,000 PSI. All moving parts in contact with water shall be of high quality bronze or stainless steel. Pump utilizing castings made of lower tensile strength cast iron not acceptable.

Pump body shall be horizontally split, on a single plane, in two sections, for easy removal of entire impeller assembly including wear rings and bearings from beneath the pump without disturbing piping or the mounting of the pump in chassis.
The pump shall have one double suction impeller. The pump body shall have two opposed discharge volute cutwaters to eliminate radial unbalance.

Pump shaft to be rigidly supported by three bearings for minimum deflection. One high lead bronze sleeve bearing shall be located immediately adjacent to the impeller (on side opposite the drive unit). The sleeve bearing is to be lubricated by a force-fed, automatic oil lubricated design, pressure balanced to exclude foreign material. The remaining bearings shall be heavy-duty, deep groove ball bearings in the gearbox and they shall be splash lubricated.

The pump impeller shall be hard, fine grain bronze of the mixed flow design; accurately machined, hand-ground and individually balanced. The vanes of the impeller intake eyes shall be hand ground and polished to a sharp edge, and be of sufficient size and design to provide ample reserve capacity utilizing minimum horsepower.

The impeller clearance rings shall be bronze, easily renewable without replacing impeller or pump volute body, and of wraparound double labyrinth design for maximum efficiency.

The pump shaft shall be heat-treated, electric furnace, corrosion resistant, stainless steel, to be super-finished under packing with galvanic corrosion (zinc separators in packing) protection for longer shaft life. Pump shaft must be sealed with double lip oil seal to deep road dirt and water out of drive unit.

DRIVE UNIT

The drive unit shall be cast and completely manufactured and tested at the pump manufacturer's factory.

Pump drive unit shall be of sufficient size to withstand up to 16,000 ft. Lbs. Torque of the engine in both road and pump operating conditions. The drive unit is designed with ample capacity for lubrication reserve to maintain proper operating temperature.

The gearbox drive shafts shall be of heat-treated chrome nickel steel and at least 2-3/4" in diameter, on both the input and output drive shafts. They shall withstand the full torque of the engine in both road and pump operating conditions.

All gears drive and pump, shall be of highest quality electric furnace, chrome nickel steel. Bores shall be ground to size and teeth integrated, crown-shaved and hardened, to give an extremely accurate gear for long life, smooth, quiet running, and higher load carrying capability. An accurately cut spur design shall be provided to eliminate all possible end thrusts.

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

If drive unit is equipped with a power shift, the shifting mechanism shall be a heat-treated, hard-anodized aluminum power cylinder, with stainless steel shaft. An in-cab control for rapid shift shall be provided that locks in road or pump.

Three warning lights with plates shall be provided to alert the operator when the drive unit has fully shifted from road to pump position. Two lights shall be located on the cabs instrument panel and the other on the pump panel adjacent to the throttle.

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

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

MECHANICAL SEAL

The midship pump shall be equipped with a high quality, spring loaded, and self-adjusting mechanical seal capable of providing a positive seal to atmosphere under all pumping conditions. This positive seal to atmosphere must be achievable under vacuum conditions up to 26 Hg (draft) or positive suction pressures up to 250 PSI.

The mechanical seal assembly shall be 2 inches in diameter and consist of a carbon sealing ring, stainless steel coil spring, Viton rubber boot, and a tungsten carbide seat, with a Teflon backup seal provided.

Only one mechanical seal shall be required, located on the first stage suction (inboard) side of the pump and be designed to be compatible with a one-piece pump shaft. {No Exceptions} A continuous cooling flow of water from the pump shall be directed through the seal chamber when the pump is in operation.

PUMP SHIFT

An air operated pump shift shall be installed in the chassis cab to engage the fire pump. Provisions shall 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 shall 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 shall be provided and shall 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 shall be labeled "OK TO PUMP". The light on the pump operator shall be positioned adjacent to and preferably above the throttle control and shall be labeled "Warning: DO NOT OPEN THROTTLE UNLESS LIGHT IS ON". The green light on the pump operator's panel shall be energized when the pump is engaged, the transmission is in drive, and the parking brake is set.

PRIMING SYSTEM, PUMP

A Trident Model 31.011.0 or equivalent automatic air operated priming system shall be installed. The unit shall be of all brass and stainless steel construction and designed for fire pumps of 1,250 GPM (4,690 LPM) or more. Due to corrosion exposure no aluminum or vanes shall be used in the primer design. The primer shall be three-barrel design with direct connection to the fire pump. The primer shall automatically drain when the panel control actuator is not in operation.

The primer shall be mounted above the pump impeller so that the priming line will automatically drain back to the pump. The primer shall also automatically drain when the panel control actuator is not in operation. The inlet side of the primer shall include a brass 'wye' type strainer with removable stainless steel fine mesh strainer to prevent entry of debris into the primer body.

Performance, Safety, and NFPA Compliance
The priming system shall be capable to a vertical lift to 22 inches of mercury and shall be fully compliant to applicable NFPA standards for vertical lift. The system shall create vacuum by using air from the chassis air brake system through a two-barrel multi-stage internal "venturi nozzles" within the primer body. The noise level during operation of the primer shall not exceed 75 Db.

Air Flow Requirements
The primer shall require a minimum of 15.6 cubic foot per minute air compressor and shall be capable of meeting drafting requirements at high idle engine speed. The air supply shall be from a chassis supplied 'protected' air storage tank with a pressure protection valve. The air supply line shall have a pressure protection valve set between 70 to 80 PSIG.

Automatic Primer Control and Vacuum Gauge Panel
The 12 volt primer control shall be an "automatic" type, with a pump panel three-way switch to operate an air solenoid valve. The air valve shall direct air pressure from the air brake system to the primer. To prevent freezing, no water shall enter the primer valve control.

A vacuum gauge 2" in diameter, with graduations from zero to 30 feet, shall be installed in the primer control panel. The gauge shall be physically connected to the vacuum side of the primer and read only when the primer is running so it will never see or be subject to damage from high pump intake pressures.

The automatic priming switch shall have three positions as follows:
"Prime" – the lower position shall be a momentary "push to prime". The "Prime" position also allows the operator to "ramp" test the primer without the fire pump being engaged.

"Off" -- center position

"Auto-Prime" – in the upper position, a "green" LED pilot light shall be illuminated when the switch is the auto-prime position. The "Auto-Prime" operates automatically when the pump pressure drops below 20 PSIG. The primer shuts "off" automatically when the pump pressure is re-established and exceeds 20 PSIG. The "Auto" mode only operates when the fire pump is engaged.

Power Requirements
To reduce the electrical power requirements on the fire apparatus the priming system shall be air powered. The system shall not require annual tear-down and maintenance, an electric motor, lubrication, belt drive, or clutch assembly. The maximum current draw shall not exceed 0.5 amps during operation.

Warranty
The primer shall be covered by a five-(5) year parts warranty.

VALVE, MASTER DRAIN

There shall 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.

VALVE, INDIVIDUAL DRAIN

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

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

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

All drains and bleeders shall discharge below the running boards.

U.L. TEST POINTS

An Underwriters Laboratories approved engine speed counter shall be located on the pump panel to provide a means to certify the tachometer. In addition, two (2) U.L. test plugs shall be pump panel mounted for testing of vacuum and pressures.

U.L. CERTIFICATION, 2000 GPM

The vehicle shall be third party tested and certified by Underwriters Laboratories, Inc. UL testing is recognized as a leading, third party, "Product Safety Certification" organization for over 100 years. UL has served on the NFPA (National Fire Protection Association) technical committee for over thirty-(30) years.

The testing organization must meet the following minimum requirements:
Must be nationally recognized testing laboratory recognized by OSHA

Must comply with the ASTM (American Society for Testing Materials) standard E543 "Determining the qualifications for nondestructive testing agencies"

Must have more than forty-(40) years of Automotive Fire Apparatus safety testing experience and more than fifteen-(15) years of factory aerial device testing and Certification experience

Must not represent, be associated with, or in the manufacture or repair of automotive fire apparatus

Must provide proof of ten-(10) million dollars in excess liability insurance for bodily injury and properly damage combined

The pump shall meet and perform the following test to receive a U.L. 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

PUMP TEST CERTIFICATION PLATE

A permanently affixed plate shall be installed at the pump operator's panel. It shall provide the rated discharge and pressures together with the speed of the engine as determined by the certification test for each unit. It shall 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 shall 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.

SUCTION HEADERS

A 6" NST non-gated suction header with removable screen, and long handled cap shall be provided on the left side of the pump.

A 6" NST non-gated suction header with removable screen, and long handled cap shall be provided on the right side of the pump.

THERMAL RELIEF VALVE W/LIGHT

The pump shall be equipped with a Hale TRV-L or equivalent thermal relief valve. The valve automatically monitors water temperature and is preset to open 120 degrees Fahrenheit. The TRV-L 120 display shall be provided on the pump panel.

AUDIBLE ALARM, THERMAL RELIEF VAVLE

An audible warning buzzer shall be provided with the Thermal Relief Valve, wired to the light installed on the pump panel in close proximity of the Relief Valve indicator plate.

INTAKE RELIEF VALVE

There shall be an Akron model 59 suction side relief valve provided in the pump system. The relief valve is adjustable from 50-175 psi and set at the factory at 125 psi.

TANK TO PUMP

One (1) 3” ball valve shall be installed between the pump and the water tank. The tank to pump valve shall be a quarter turn fixed pivot design constructed from bronze. The valve shall be controlled by a chrome push/pull locking “T” handle installed at the left pump panel.

TANK FILL

There shall be a 2" pump to tank fill line installed, with a 2" inline bronze valve and high-pressure flexible hose tested to 1200 PSI. The valve shall be (locking "T" handle) push-pull controlled at the pump operator’s panel.

ENGINE COOLER

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

PUMP COOLER

The pump shall 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 shall be controlled from the pump operators panel by a 3/8" 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 shall be installed thru the pump panel and clearly labeled.

PLUMBING SYSTEM

All suction and discharge lines of 2" or larger shall be constructed of a minimum of Schedule 40 galvanized steel pipe, where vibration or chassis flexing may damage or loosen threaded pipes, Victaulic or Roustabout couplings shall be used. All suction and discharge outlets shall have National

Standard Threads (NST) and designed for 500 PSIG including, valves, drain cocks, lines, intake, and outlet closures, excluding the tank fill and tank to pump lines (tank side of the valves).

STAINLESS STEEL FOAM MANIFOLD

The foam manifold shall be constructed of stainless steel.

PUMP PAINTING

The pump shall be painted black in color.

AKRON PUSH-PULL CONTROL VALVE PACKAGE

All discharge valves shall be Akron Heavy-Duty Swing-Out push/pull controlled from the pump operator's panel unless otherwise specified.

The Akron Swing-Out Heavy-Duty valves are designed for operating pressures to 250 psi (17 bars)

- 10-year warranty against manufacturer's defects
- Available in 1"to 4" sizes
- 90° handle travel 316 stainless steel ball with Hydromax technology
- Improved sealing & increased gating ability
- Flow optimization reduces turbulence while in the gated position and requires lower operating forces
- No lubrication or regular maintenance required
- Simple two seated design (no O-Rings to cut or lose during assembly or maintenance)
- Wide range of available adapters
- Designed and tested to exceed NFPA requirements
- Cast, machined and assembled at our facilities in Wooster, Ohio

All valve packages shall meet current NFPA 1901 Standards for valve operating speeds when controlled by gear, electric actuator, or slow close device.

SUCTION, 2-1/2" LEFT REAR PANEL

One-(1) 2-1/2” swing operated ball valve shall be installed at the pump panel, left rear plumbed to the suction side of the pump with 2-1/2” piping, 2-1/2" FNST chrome inlet swivel, brass inlet strainer, chrome plug with chain, and 3/4” drain valve.

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

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

DISCHARGE ELBOWS

All 2-1/2" side discharge outlets shall terminate with chrome-plated 30-Degree elbows with 2-1/2" MNST threads, chrome vented cap and chain.

Caps shall 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.

FRONT BUMPER DISCHARGE

There shall be one-(1) front discharge installed in the front bumper, center hose well.

The front bumper discharge shall terminate 2" NPT x 1-1/2" NST with a 90-degree swivel. One-(1) 2" brass valve with 3/4" drain shall 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 shall be push/pull controlled at the pump operator's panel.

NO. 1 SPEEDLAY, 1-3/4" DOUBLE LAY

One-(1) pre-connected speedlay compartment shall be provided ahead of the side mount operator's panel accommodating 200' of 1-3/4" double jacket hose, with stainless steel nylon guided rollers installed at each end, and stainless steel scuff plates around the perimeter of the speedlay protecting the painted surfaces.

One-(1) 2" ball valve with 3/4” drain and Chicksan swivel shall be provided plumbed to the speedlay with 2" high-pressure flexible hose stainless steel couplings tested to 1200 PSI, the valve shall be push/pull controlled at the pump operator's panel.

Each discharge is equipped with a quarter-turn drain valve.

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

NO. 2 SPEEDLAY, 1-3/4" DOUBLE LAY

One-(1) pre-connected speedlay compartment shall be provided ahead of the side mount operator's panel accommodating 200' of 1-3/4" double jacket hose, with stainless steel nylon guided rollers installed at each end, and stainless steel scuff plates around the perimeter of the speedlay protecting the painted surfaces.

One-(1) 2" ball valve with 3/4” drain and Chicksan swivel shall be provided plumbed to the speedlay with 2" high-pressure flexible hose stainless steel couplings tested to 1200 PSI, the valve shall be push/pull controlled at the pump operator's panel.

Each discharge is equipped with a quarter-turn drain valve.

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

NO. 3 SPEEDLAY, 2-1/2" DOUBLE LAY

One-(1) pre-connected speedlay compartment shall be provided ahead of the side mount operator's panel accommodating 200' of 2-1/2" double jacket hose, with stainless steel nylon guided rollers installed at each end, and stainless steel scuff plates around the perimeter of the speedlay protecting the painted surfaces.

One-(1) 2-1/2" ball valve with 3/4” drain and Chicksan swivel shall be provided plumbed to the speedlay with 2-1/2" high-pressure flexible hose stainless steel couplings tested to 1200 PSI, the valve shall be push/pull controlled at the pump operator's panel.

Each discharge is equipped with a quarter-turn drain valve.

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

REMOVABLE SPEEDLAY HOSE TRAYS

There shall be three-(3) removable, speed lay hose trays 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.

SPEEDLAY COVERS

Three-(3) Hypalon speedlay covers shall be provided one each side of the apparatus secured with

Velcro sides and stainless steel bottom pushpins preventing hose from inadvertently deploying during normal operations meeting the current NFPA requirements.

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

The end flaps shall be red in color.

DISCHARGE, 2-1/2" LEFT FRONT PANEL

One-(1) Akron or equivalent 2-1/2" Heavy-Duty ball valve with 3/4” drain shall be installed at the pump panel left front plumbed to the discharge side of the pump push/pull controlled from the pump operator's panel.

DISCHARGE, 2-1/2" LEFT REAR PANEL

One-(1) Akron or equivalent 2-1/2" Heavy-Duty ball valve with 3/4” drain shall be installed at the pump panel, left rear, plumbed to the discharge side of the pump push/pull controlled from the pump operator's panel.

DISCHARGE, 2-1/2" RIGHT FRONT PANEL

One-(1) Akron or equivalent 2-1/2" Heavy-Duty ball valve with 3/4” drain shall be installed at the pump panel, right front, plumbed to the discharge side of the pump push/pull controlled from the pump operator's panel.

DISCHARGE, 3" RIGHT REAR PANEL

One-(1) Akron or equivalent 3" Heavy-Duty (Slo-Close) ball valve with 3/4” drain shall be installed at the pump panel, right rear, plumbed to the discharge side of the pump equipped with 3" NST threads chrome cap and chain handwheel controlled at the pump operator's panel.

DECK GUN PLUMBING, 3"

One-(1) Akron or equivalent 3" Heavy-Duty (Slo-Close) inline valve with 3/4” drain shall be plumbed to the Deck Gun discharge outlet with 3” pipe terminating 3" FNPT x four-(4) bolt flange handwheel controlled at the pump operator's panel.

REMOTE CONTROL TELESCOPING MONITOR PIPE

A Task Force Tips model XGA38PL-RL 3" or equivalent electrically telescoping waterway shall be installed. The waterway shall be capable of being lowered to deck level (or into a monitor well) for storage and transportation and shall be capable of being raised to an extended height of 18" using Auxiliary 1 push button and retract after the monitor has been parked by pressing the Park button on Task Force Tips RC monitor control stations or from optional panel mounted push buttons. The unit shall include a 12 volt motor capable of moving the waterway to either the raised or lowered position. The motor shall be weatherproof in design and have an accessible manual override control for use in the event power failure occurs. An interface box with cables and waterproof plugs shall be provided for connection of power, monitor, Extend-A-Gun RC and optional push button controls.

A sensor shall 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 shall have a 3" waterway; hardcoat anodized finish and be furnished with a 3" male NPT inlet coupling and a TFT Code RLM male connection for a TFT remote control monitor with TFT Code RLF female inlet. The unit shall be covered by a five-year warranty. The unit shall be covered by a five-year warranty.

ELECTRIC MONITOR

A Task Force Tips Monsoon RC, model Y4-E11A or equivalent remote controlled monitor shall be installed. The monitor shall operate with 12 or 24 volt direct current and controlled by a monitor mounted switch panel with functions that control rotation, elevation, nozzle patterns, programmable park and oscillate, auxiliary 1 and auxiliary 2.

The electrical components for the monitor shall be waterproof and utilize current limiting and position encoders to protect the drive train at the ends of travel. Monitor shall have thirty feet of four conductor ultra flex robotic power cable and include a unique cable guide for 450 degrees of monitor rotation. A six-pin electrical connection for a TFT remote control nozzle shall be provided. The monitor shall be compatible with optional wired and wireless control stations and monitor position display. The monitor shall be equipped with manual override knobs for use in the event of power failure. The motors and knobs control stainless steel worm gears for rotation and elevation adjustment.

The monitor shall have the following capabilities:
Full horizontal rotation with travel 225 degrees left and right of center;
135 degrees of vertical travel with stops at 90 degrees above horizontal and 45 degrees below horizontal;
Field changeable rotation stops at 45, 90 and 135 degrees left and/or right of center and 45 degrees above and/or 30 degrees below horizontal;
Flow capability of 2000 GPM with friction loss no more than16 psi;
Maximum operating pressure of 200 PSI

For resistance to corrosion the monitor shall be constructed from hardcoat anodized aluminum with a silver powder coat interior and exterior finish. A threaded port for an optional pressure gauge shall be provided. The unit shall have a unique serial number and be covered by a written five-year warranty.

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

A Task Force Tips Master Stream 1000, model M-ER1000-NJ or equivalent automatic nozzle with electrically operated pattern control shall be provided. The nozzle design shall allow for straight stream through dense wide fog patterns.

The electric drive unit shall develop over 400 pounds of torque, be enclosed in a waterproof cast aluminum housing and include a manual override device in the event the power source fails. The unit shall be compatible with 12 or 24 volt power systems and require no more than a 3 amp power draw and include a 60" connection cable.

For corrosion resistance and durability the nozzle and actuator shall be constructed from hardcoat anodized aluminum alloy, include a protective rubber bumper with fog teeth, laser engraved serial number, and reflective labeling.

The nozzle shall have a 2-1/2" female NH swivel rocker lug coupling and a flow range of 150-1000 GPM at 100 PSI. The nozzle shall be designed to accept the TFT FJ-LX-M FoamJet low expansion air aspirating attachment.

A Task Force Tips model # YE-RF-900 or equivalent wireless operator station for Monsoon, Hurricane, Typhoon, and Tornado series remote control monitors shall be installed.

The 900Mhz wireless transmitter shall be designed for remote usage and operate up to 500 feet away from the monitor-mounted receiver. The remote control includes membrane switches to control horizontal rotation, vertical elevation, nozzle stream pattern, park, oscillate, auxiliary 1 and auxiliary 2. The handheld control enclosure shall be weatherproof, have a protective silicone rubber casing, a short, flexible antenna, four replaceable AA lithium batteries, a "Power" button with indicator LED, and low battery indication. The included radio receiver board is connected inside the monitor mounted control box. A storage bracket for the handheld control shall be included and shall comply with NFPA

1901 Section14.1.11. The unit shall be covered by a five-year warranty.

DISCHARGE, 2-1/2" LEFT REAR

One-(1) Akron or equivalent 2-1/2" Heavy-Duty ball valve with 3/4" drain shall be plumbed to the left rear of the apparatus terminating 2-1/2" FNPT x 2-1/2"MNST with chrome cap and chain push-pull controlled at the pump operator's panel.

30 DEGREE ELBOW - 2-1/2" FNST X 2-1/2" MNST

There shall be one (1) Trident or equivalent model 01.010.0 2-1/2" FNST x 2-1/2" MNST chrome plated elbow supplied with the apparatus. The elbow shall have a 30 degree turn down.

FOAM SYSTEM

The apparatus shall be equipped with a Hale Foam Logic 6.5 or equivalent automatic, electronically controlled direct injection, rotary gear pump, and discharge side foam proportioning system. The operation of foam proportioning, shall be based on the direct measurement of water flow, and shall remain consistent within the specified flow and pressures.

FOAM PUMP
The foam proportioning system shall be compatible with Class A foam concentrates and most high viscosity normal hydrocarbon or polar solvent Class B foam concentrates. The foam proportioning system shall be capable of delivering the rated foam concentrate flow with the above-mentioned foam concentrate types.

The foam proportioning system shall be based on an electric motor driven, rotary gear foam concentrate pump, rated at 6.5 gallon per minute, foam concentrate flow rate with a maximum operating pressure of 250 PSIG (17 BAR). The electric motor shall be powered by 12 volts direct current with a 3/4 HP (0.5kw) power rating at a maximum current draw of 60 amps.

The rotary gear pump shall be close coupled to the motor without an oil-filled gearbox. The foam concentrate pump and all wetted parts of the system shall be constructed of corrosion resistant materials compatible with all foam concentrates being used. The pump body, pump head, and pump cover shall be constructed of bronze with pump shaft, gears, and bearings constructed from stainless steel. There shall be a mechanical (pump shaft) seal provided to prevent foam concentrate from leaking around the rotating shaft. An internal (foam concentrate) relief valve constructed of stainless steel and preset at the factory for maximum system operating pressure shall be incorporated into the foam pump to protect the pump from over-pressurization. No components of the foam concentrate pump and foam system shall be manufactured from aluminum.

The foam pump motor assembly shall be permanently attached to the apparatus mountable base plate. The entire base plate mounted assembly shall have electrical components sealed to NEMA 4X for mounting in the apparatus pump compartment / suitable location on the apparatus.

There shall be a foam concentrate flowmeter integral to the foam concentrate pump. The foam concentrate flow meter shall provide a signal to the electronic control unit to make sure the proper amount of foam concentrate be injected into the discharge stream.

CONTROL SYSTEM
The system shall be equipped with an electronic control unit, suitable for installation on the pump operator's panel as the single point of operation for the foam proportioning system. Incorporated within the control unit shall be a microprocessor that receives input from water flowmeter(s) while receiving foam concentrate pump output information from the foam concentrate flowmeter.

The microprocessor, through constant comparison of the flow signals, ensures the operator of preset proportional amounts of foam concentrate injected into the discharge stream of the fire pump. The electronic control unit shall permit the pump operator to perform the following control and operation functions for the foam proportioning system:

(1) Provide push button On/Off control of foam proportioning system
(2) Provide push button control of foam proportioning rates from 0.1% to 10.0% in 0.1% increments
(3) Show real time flow rate of water or foam solution
(4) Show total volume of water or foam solution discharged during and after foam operations
(5) Show foam concentrate injection rate
(6) Show total amount of foam concentrate consumed
(7) Permit resetting of total values for water and foam concentrate
(8) Simulate water flow rates for manual operation, calibration, and testing of foam system
(9) Enable system setup and full range system diagnostic functions
(10) Indicate on LED bar graph foam concentrate being injected and the foam system capacity
(11) Store independent default values for Class A and Class B foam concentrate
(12) Flash a "Low Concentrate" warning when the foam concentrate tank runs low
(13) Flash a "No Concentrate" warning and shuts the system off when the foam tank is empty
(14) Flash a "Low Battery" warning when battery voltage is low enough to affect system operation
(15) Flash a "Hot" warning when the system is running hot due to low voltage or radiant heat

There shall be a distribution box attached to the base plate to provide ease of installation. The distribution box shall be sealed to a NEMA 4 times or equal rating to permit the installation in the pump compartment.

Foam concentrate flow feedback shall be provided to the control unit through the distribution box by a sensor mounted in the foam pump body. Rotors in the foam discharge side of the foam pump shall provide the targets to pulse the sensor to generate a feedback signal.

DISTRIBUTION BOX
The distribution box shall receive 12-volt direct current power from the apparatus electrical system as the only source of power to operate the system and power component sensors. The control power shall be distributed to the control unit, flowmeter sensor and foam concentrate feedback sensor through a conductor in the 100% shielded cable set provided by the foam-proportioning manufacturer. The microprocessor in the control unit shall process input signals from the flowmeter sensor and foam feedback sensor to determine proper duty cycle for the electric motor to run. The distribution box shall provide power to the electric motor, based on signals received from the control unit, at a variable rate to ensure that the correct proportion of foam concentrate, preset by the pump operator on the control unit, is injected into the discharge stream. The distribution box shall have a main power control switch and over current protection for the foam proportioning system. All primary electrical wires for the foam concentrate system shall be type SXL OR GXL (SAE J1128) per NFPA requirements. Electrical connection shall be made using heavy-duty 5/16" diameter studs and nuts.

CONTROL CABLES
The cables for connection of the control unit, distribution box, flowmeter display units, pressure transducers, and feedback sensor shall be 100% electrically shielded, molded male by female cord sets. The cord sets shall have the ability to connect together and the total length shall not exceed forty (40') feet. The connections shall be keyed to prevent misconnects and improper system operation. Shielding shall be provided by an aluminized cord sets Mylar shield within the PVC outer jacket. A drain wire shall be tied to one of the pins on each end of the cable. No externally attached ferrite beads shall be installed for electrical shielding. Coupling nuts on the cord sets ends shall be constructed of nickel-coated brass. Once proper connection have been made, the connections shall be sealed to NEMA 4X or equal.

SYSTEM PERFORMANCE & OPERATION	
Foam Pump	- Rotary Gear
Foam Output	- 6.5 GPM (25 LPM)

System Operating Pressure	- 150 PSIG (10 BAR)
Maximum Operating Pressure	- 200 PSIG (17 BAR)
Maximum Operating Temperature	- 160 deg. F (71 deg. C)
Pump Motor	- 3/4 HP (0.5 KW) 12 Volt DC
Operating Amp Draw	- 15 Amps
Maximum Amp Draw	- 45 Amps

SYSTEM CAPACITY			
FOAM CONCENTRATION			WATER FLOW
0.1%	@	5000 GPM	(18927 LPM)
0.2%	@	2500 GPM	(9463 LPM)
0.3%	@	1667 GPM	(6310 LPM)
0.5%	@	1000 GPM	(3785 LPM)
1.0%	@	500 GPM	(1893 LPM)
3.0%	@	167 GPM	(632 LPM)
6.0%	@	83 GPM	(314 LPM)

WARRANTY
The foam proportioning system shall have a one-(1) year limited manufacturer warranty.

STAINLESS STEEL FOAM MANIFOLD

The foam manifold shall be constructed of stainless steel.

BY-PASS VALVE

When a manual dual tank selector, single tank flush valve or a single tank system, without flushing capabilities is installed, there shall be a three-way bypass valve provided on the discharge of the foam pump. This shall permit operation of the foam concentrate pump for test and calibration purposes without injecting foam concentrate into the water discharge. The bypass valve shall be capable of being panel mounted.

CHECK VALVES, WATERWAY

There shall be wafer type check valves installed in the water pump discharge piping prior to the foam injection point. This shall prevent the contamination of the water pump and the apparatus booster tank.

INTEGRAL CHECK VALVE/INJECTOR FITTINGS

There shall be integral check valves/ injector fittings installed to prevent contamination of the foam concentrate supply. The foam concentrate shall be injected into the water pumps discharge stream through this check valve/injector fitting. The check valve/injector fitting shall be of one-piece construction of brass and stainless steel.

FOAM CONCENTRATE STRAINERS, FLUSHING SYSTEMS

There shall be a strainer body constructed of brass provided on this system, which is subject to flushing water pressure. The panel mounted, field serviceable, foam concentrate strainer rated at 500 PSIG (34 BAR) minimum shall be installed on the pump panel. The strainer body constructed of brass with a chrome cap and an easily removable stainless steel mesh screen shall be provided. A 1-1/2" strainer with a 3/4" NPT connection ports shall be used for Class A foam concentrate and a 2-1/2" strainer with 1" NPT connection ports shall be used for Class B foam concentrate.

FLOWMETER W/DISPLAY UNIT

A paddlewheel type flowmeter shall monitor water flow in foam capable discharges. The flowmeter body shall be constructed of bronze and the sensor assembly be locked into the tee with a pin and screw on cap. The flowmeter shall have a 500 PSIG (34 BAR) pressure rating per NFPA requirements.

One (1) flowmeter is required for proper operation of the foam proportioning system. Power for the flowmeter sensor shall be provided through the electrically shielded cable set from the control unit. Flowmeter having NPT threaded and Victaulic connections shall be used in the water discharge piping. The flowmeter selected shall be sized to monitor the minimum and maximum flow expected in the foam capable discharges.

FOAM CONCENTRATE PLATE

A permanently affixed plate shall be installed at or near any foam concentrate tank fill opening that reads "FOAM TANK FILL".

A permanently affixed plate shall be installed at or near any foam concentrate tank fill opening. This plate shall specify the type(s) of foam concentrate the system is designed to use, any restrictions on the types of foam concentrate that can be used with the system and a warning message that reads "WARNING: DO NOT MIX BRANDS AND TYPES OF FOAM".

GAUGES, FOAM LEVEL

A Fire Research TankVision Pro model WLA360-A00 or equivalent tank indicator kit shall be installed on the pump operator’s panel. The kit shall include an electronic indicator module, a pressure sensor, a 10' sensor cable and a tank vent. The indicator shall show the volume of Class A foam concentrate in the tank on nine (9) easy to see super bright RGB LEDs. A wide view lens over the LEDs shall provide for a viewing angle of 180 degrees. The indicator case shall be waterproof, manufactured of Polycarbonate/Nylon material, and have a distinctive green label.

The program features shall be accessed from the front of the indicator module. The program shall 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 shall include flashing LEDs at 1/4 tank, down chasing LEDs when the tank is almost empty, and an output for an audio alarm.

A Fire Research TankVision Pro model WLA370-A00 or equivalent tank indicator kit shall be installed on the pump operator’s panel. The kit shall include an electronic indicator module, a pressure sensor, a 10' sensor cable and a tank vent. The indicator shall show the volume of Class B foam concentrate in the tank on nine (9) easy to see super bright RGB LEDs. A wide view lens over the LEDs shall provide for a viewing angle of 180 degrees. The indicator case shall be waterproof, manufactured of Polycarbonate/Nylon material, and have a distinctive green label.

The program features shall be accessed from the front of the indicator module. The program shall 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 shall include flashing LEDs at 1/4 tank, down chasing LEDs when the tank is almost empty, and an output for an audio alarm.

FOAM TANK

The foam proportioning system shall be supplied from the foam storage tanks. The tanks shall be constructed of material compatible with foam concentrates being used in the system. Provision shall be made for installation of low-level tank sensors, and routing of sensor wiring. Tank capacity, venting, fill opening and foam outlet plumbing, connections shall be in accordance with NFPA requirements.

DOCUMENTATION - FOAM MASTER SYSTEM

There shall be provided the following information upon delivery of the apparatus:

- Foam Concentrate Compatibility List
- Two Description Manuals
- Two Installation Manuals
- Two Operation Manuals

TANK SELECTOR AND FLUSHING VALVES, DUAL TANK

Dual concentrate tanks, when installed on the apparatus, shall have a dual tank switch over system installed to provide a rapid change over of foam concentrate reservoirs. The dual tank selector valves shall also have provision for connection of flushing water to prevent mixing of dissimilar, incompatible foam concentrates.

LOW TANK LEVEL SWITCH

A low tank level switch shall be installed in each foam concentrate tank that supplies the foam proportioning system. The low tank level sensor shall be connected to the foam proportioning system to provide protection against dry running of the foam pump. The low tank level sensor can be mounted on the side, bottom, or top of the foam concentrate tank. The low tank level sensor and electrical connections shall be sealed to prevent infusion of foam concentrate into the wiring and possible short circuit of the tank level sensor.

OPERATING SYSTEMS INSTRUCTION PLACARD, DUAL TANK

There shall be an operating instruction system placard installed on the pump panel. This placard shall be a schematic of the dual tank foam system, which has been installed.

FOAM TANK NO. 1

The foam tank shall have a capacity of 30 gallons designed as an integral part of the water tank and shall have a manual fill tower. The fill tower shall be constructed of 1/2" PT3™ polypropylene and shall be a minimum dimension of 8" x 8" outer perimeter. Each foam fill tower shall be constructed of a colored material (yellow, green and black) indicating which tower is to receive each type of foam utilized. The capacity of the tank shall be engraved on the top of the fill tower lid. The tower shall be located in the right front corner of the tank unless otherwise specified. The tower shall have a 1/4" thick removable polypropylene screen and a stainless steel hinged-type cover. Inside the fill tower, approximately 1.5” down from the top, there shall be an anti-foam fill tube that extends down to the bottom of the tank. A pressure vacuum vent shall be provided in the lid of the fill tower.

FOAM TANK NO. 2

The foam tank shall have a capacity of 30 gallons designed as an integral part of the water tank and shall have a manual fill tower. The fill tower shall be constructed of 1/2" PT3™ polypropylene and shall be a minimum dimension of 8" x 8" outer perimeter. Each foam fill tower shall be constructed of a colored material (yellow, green and black) indicating which tower is to receive each type of foam utilized. The capacity of the tank shall be engraved on the top of the fill tower lid. The tower shall be located in the right front corner of the tank unless otherwise specified. The tower shall have a 1/4" thick removable polypropylene screen and a stainless steel hinged-type cover. Inside the fill tower, approximately 1.5” down from the top, there shall be an anti-foam fill tube that extends down to the bottom of the tank. A pressure vacuum vent shall be provided in the lid of the fill tower.

FOAM REFILL SYSTEM

A Hale EZ-Fill, 5 gpm (12 volt | 24 volt), Foam Refill System or equivalent shall be installed for refilling the on-board foam cells. The EZ-Fill push-button Smart Switch is used to easily fill or flush the system. The Pickup Wand is attached using a positive seal quick connect fitting and is used to pull the foam concentrate from its container and transfer into the on-board foam cell. The system shall be able to refill to both the A and B concentrate tanks.

FOAM OUTLETS

Foam shall be plumbed to the following outlets:

Front Bumper Discharge

No. 1 Speedlay

No. 3 Speedlay

Pump Panel Upper Left Front Discharge

FILL SUBSURFACE/RETURN LINE

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

WATER TANK

The tank shall have a capacity of 1000 U.S. gallons and shall be constructed of PT3™ polypropylene material. This material shall be a non-corrosive stress relieved thermoplastic and UV stabilized for maximum protection. Tank shell thickness may vary depending on the application and may range from ½ to 1” as required. Internal baffles are generally 3/8” in thickness.

ISO CERTIFICATION

The tank must be "T" shaped in design and fabricated by a tank manufacturer that is ISO 9001:2008 certified in each of its locations. The ISO certification must be to the current standard in effect at the time of the design and fabrication of the tank.

DESIGN

Each tank is designed to the customer’s specification and/or drawing submittal. An approval drawing is sent to the customer prior to commencing manufacturing. Upon receipt of the signed approval drawing, the tank is scheduled for production.

CONSTRUCTION

The booster and/or foam tank shall be of a specific configuration and is so designed to be completely independent of the body and compartments. Joints and seams shall be fused using nitrogen gas as required and tested for maximum strength and integrity. The tank construction shall include PolyProSeal™ technology wherein a sealant shall be installed between the plastic components prior to being fusion welded. This sealing method shall provide a liquid barrier offering leak protection in the event of a weld compromise. The top of the booster tank is fitted with removable lifting assembly designed to facilitate tank removal. The transverse and longitudinal swash partitions shall be manufactured of a minimum of 3/8" PT3™ polypropylene. All partitions shall be equipped with vent and air holes to permit movement of air and water between compartments. The partitions shall be designed to provide maximum water flow.

All swash partitions interlock with one another and are completely fused to each other as well as to the walls of the tank. All partitions and spacing shall comply with NFPA 1901. The walls shall be welded to the floor of the tank providing maximum strength as part of the tank’s unique Full Floor Design™. Tolerances in design allow for a maximum variation of 1/8” on all dimensions.

WATER FILL TOWER AND COVER

The tank shall have a combination vent and manual fill tower. The fill tower shall be constructed of 1/2" PT3™ polypropylene and shall be a minimum dimension of 8" x 8" outer perimeter. The fill tower shall be blue in color indicating that it is a water-only fill tower. The tower shall be located in the left front corner of the tank unless otherwise specified by the tank manufacturer to the purchaser. The tower shall have a 1/4" thick removable polypropylene screen and a PT3™ polypropylene hinged cover. The capacity of the tank shall be engraved on the top of the fill tower lid. Inside the fill tower there shall be a combination vent/overflow pipe. The vent overflow shall be a minimum of schedule 40 polypropylene

pipe with a minimum I.D. of 4" that is designed to run through the tank, and shall be piped to discharge water behind the rear wheels as required in NFPA 1901 so as to not interfere with rear tire traction. The tank cover shall be constructed of 1/2" thick PT3™ polypropylene and UV stabilized, to incorporate a multi-piece locking design, which allows for individual removal and inspection if necessary. The tank cover(s) shall be flush or recessed 3/8" from the top of the tank and shall be fused to the tank walls and longitudinal partitions for maximum integrity. Each one of the covers shall have hold downs consisting of 2" minimum polypropylene dowels spaced a maximum of 40” apart. These dowels shall extend through the covers and shall assist in keeping the covers rigid under fast filling conditions. A minimum of two lifting dowels shall accommodate the necessary lifting hardware.

SUMP

There shall be one (1) sump standard per tank. The sump shall be constructed of a minimum of 1/2" PT3™ polypropylene and be located in the left front quarter of the tank, unless specified otherwise. On all tanks that require a front suction, a 3" schedule 40 polypropylene pipe shall be installed that shall incorporate a dip tube from the front of the tank to the sump location. The sump shall have a minimum 3" NPT threaded outlet on the bottom for a drain plug per NFPA. This shall be used as a combination clean-out and drain. All tanks shall have an anti-swirl plate located approximately 3” above the inside floor.

OUTLETS

There shall be two (2) standard tank outlets: one for the tank-to-pump suction line, which shall be sized to provide adequate water flow to the pump; and, one for tank fill line, which shall be sized according to the NFPA minimum size chart for booster tanks. All tank fill couplings shall be backed with flow deflectors to break up the stream of water entering the tank, and be capable of withstanding sustained fill rates of up to 1000 GPM. The addition of rear suction fittings, nurse valve fittings, dump valve fittings, and through-the-tank sleeves to accommodate rear discharge piping must be specified. All auxiliary outlets and inlets must meet all NFPA guidelines in effect at the time of manufacture.

MOUNTING

The UPF Poly-Tank® III or equivalent shall rest on the body cross members in conjunction with such additional cross members, spaced at a distance that would not allow for more than 530 square inches of unsupported area under the tank floor. In cases where overall height of the tank exceeds 40 inches, cross member spacing must be decreased to allow for not more than 400 square inches of unsupported area. The tank must be isolated from the cross members through the use of hard rubber strips with a minimum thickness and width dimension of 1/4” x 1” and a Shore A Hardness of approximately 60 durometer. The rubber must be installed so it shall not become dislodged during normal operation of the vehicle. Additionally, the tank must be supported around the entire bottom outside perimeter and captured both in the front and rear as well as side to side to prevent tank from shifting during vehicle operation. A picture frame type cradle mount with a minimum of 2" x 2" x 1/4” mild steel, stainless steel, or aluminum angle shall be provided or the use of corner angles having a minimum dimension of 4" x 4" x 1/4” by 6” high are permitted for the purpose of capturing the tank. Although the tank is designed on a free floating suspension principle, it is required that the tank have adequate vertical hold down restraints to minimize movement during vehicle operation. If proper retention has not been incorporated into the apparatus hose floor structure, an optional mounting restraint system shall be located on top of the tank, half way between the front and the rear on each side of the tank. These stops can be constructed of steel, stainless steel or aluminum angle having minimum dimensions of 3" x 3" x 1/4” and shall be approximately 6” to 12” long. These brackets must incorporate rubber isolating pads with a minimum thickness of 1/4” inch and a hardness of 60 durometer affixed on the underside of the angle. The angle should then be bolted to the body side walls of the vehicle while extending down to rest on the top outside edge of the upper side wall of the tank. Hose beds floors must be so designed that the floor slat supports extend full width from side wall to side wall and are not permitted to drop off the edge of the tank or in any way come in contact with the individual covers where a puncture could occur. Tank top must be capable of supporting loads up to 200 lbs. per sq. foot when evenly distributed. Other equipment such as generators, portable pumps,

etc. must not be mounted directly to the tank top unless provisions have been designed into the Poly-Tank® III for that purpose. The tank shall be completely removable without disturbing or dismantling the apparatus structure.

CAPACITY CERTIFICATION

All water and foam tanks shall be tested and certified as to capacity on a calibrated and certified tilting scale. Each tank shall be weighed empty and full to provide precise fluid capacity. Each Poly-Tank® III is delivered with a Certificate of Capacity delineating the weight empty and full and the resultant capacity based on weight. Engineering estimates for capacity calculations shall not be permitted for capacity certification.

TANKNOLOGY™ TAG

A tag shall be installed on the apparatus in a convenient location and contain pertinent information including a QR code readable by commercially available smart phones. The information contained on the tag shall include the capacity of the water and foam (s), the maximum fill and pressure rates, the serial number of the tank, the date of manufacture, the tank manufacturer, and contact information. The QR code shall allow the user to connect with the tank manufacturer for additional information and assistance.

WATER TANK SIZE CERTIFICATION

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

GAUGE, WATER LEVEL

A Fire Research TankVision or equivalent Pro model WLA300-A00 tank indicator kit shall be installed on the pump operator's panel. The kit shall include an electronic indicator module, a pressure sensor, and a 10' sensor cable. The indicator shall 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 shall provide for a viewing angle of 180 degrees. The indicator case shall be waterproof, manufactured of Polycarbonate/Nylon material, and have a distinctive blue label.

The program features shall be accessed from the front of the indicator module. The program shall 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 shall include flashing LEDs at 1/4 tank, down chasing LEDs when the tank is almost empty, and an output for an audio alarm.

AUTOMATIC DIRECT TANK FILL, 2.5" LEFT REAR

There shall be one-(1) 2.5" rear direct tank fill provided at the left rear of the apparatus. A 2.5" Elkhart or equivalent brass ball valve shall be vertically mounted and electrically controlled at the valve. The valve shall control shall be controlled by a switch on the pump panel and shall also be tied into the tank level gauge so that the valve will open when the water level reaches a determined level and then closes when the tank is full.

30 DEGREE ELBOW - 2.5" FNST X 2-1/2" MNST

There shall be a 2.5" FNST x 2-1/2" MNST chrome plated elbow supplied with the apparatus. The elbow shall have a 30 degree turn down.

PLUG, 2-1/2" NST

There shall be a 2-1/2" plugs with chain provided with the apparatus.

APPARATUS BODY, 102" WIDE

The 102" wide apparatus body and subframe shall be constructed entirely of marine grade aluminum plate and extrusions.

BODY SUBFRAME

The main body support cross member extrusions shall be 3" x 4" 6061T6 aluminum alloy, double "I" beam with a wall thickness of 7/16" (.438"). These cross members shall extend the full width of the body to support the compartment framing. The cross members shall be welded to a 3/4" (.750") x 3" solid aluminum, 6061T6 aluminum (alloy frame rail) extrusion. The frame rail extrusion shall be shaped in contour with the chassis frame rails. The frame rail extrusion shall be mounted over a 1/2" (.5") thickness, reinforced rubber cushion to isolate the aluminum subframe from the chassis steel frame rails. The apparatus body structure shall 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 shall have a gusset above and below each cross member. The gussets shall be constructed of 2.0" x 4.0" 6063T6 aluminum alloy extrusion with a .190" wall thickness. The gussets shall 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 shall have a "C" shaped rubber tank cushion installed on the top of each member. This rubber extrusion shall 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 shall be used to hold the rubber tank cushion in place.

BODY CONSTRUCTION

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

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

The horizontal and vertical frame member extrusions shall be 2.0" x 4.0" with a .190" wall thickness. The extrusion shall be made from 6063T6 aluminum alloy. This extrusion shall have .190" outside radius corners. The longitudinal frame member, below the lower compartments shall be a 2.0" x 4.0" 6063T6 aluminum alloy extrusion with .190" radius corners. Each body corner shall be a 3.5" x 12-3/4" 6063T6 extruded aluminum section with .210" wall thickness, and shall be welded as an integral part of the body. This extrusion shall have a 1" corner radius.

COMPARTMENT CONSTRUCTION

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

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

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

Each compartment shall 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 shall be removable to provide access to service wiring and other mounted components.

WHEEL WELL PANELS, PAINTED ALUMINUM

The wheel well shall be constructed from 2" x 4" x .190" wall thickness. The extrusion shall be made from aluminum alloy and have .190" outside radius corners. The extrusion shall be slotted the full length to permit an internal fit of painted aluminum panels. The wheel well liners shall be constructed of smooth aluminum plates. They shall be bolted in place for ease of maintenance. The wheel well fenderettes shall be constructed of Stainless steel with a polished finish.

A deflection shield shall be mounted to the body subframe to keep road debris from entering the water tank area.

HOSEBED

The hosebed sides shall be constructed of (marine grade) smooth aluminum plate welded to the extruded framework. There shall be a aluminum extrusion with .190" wall thickness running the entire length of the hosebed at the top for structural rigidity. The hosebed decking shall be constructed from anodized aluminum extrusions. The extrusions shall 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 shall be removable, in one piece, to allow ease of serviceability to the tank. The hosebed shall include an extrusion across the front and rear of the compartment for the installation of adjustable hosebed dividers.
The fire apparatus hose body shall be 42" wide and shall contain a minimum of 90 cubic feet of storage.

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

COMPARTMENTS, LEFT SIDE

L2
There shall be a left front compartment installed ahead of the rear axle. This compartment shall have one-(1) roll up door. The compartment shall be approximately 57" wide x 70" high x 28" deep. The compartment shall have a useable door opening of approximately 54" wide x 61" high.

L3
There shall be one-(1) compartment installed above the wheel well. This compartment shall have one-(1) roll up door. The compartment shall be approximately 58" wide x 38" high x 28" deep. The compartment shall have a useable door opening of approximately 55" wide x 29" high.

L4
There shall be one-(1) left rear compartment installed behind the rear axle. This compartment shall have one-(1) roll up door. The compartment shall be approximately 59" wide x 70" high x transverse in the lower section and 28" deep in the upper section. The compartment shall have a useable door opening of approximately 56" wide x 61" high.

COMPARTMENT DOORS, LEFT SIDE ROLL UP

R•O•M or equivalent Series IV roll-up shutter doors shall be installed on the left side compartments of the apparatus as specified.

Shutter slats will feature a double wall extrusion 0.315” thick with a concave interior surface to minimize loose equipment jamming the shutter door closed. Shutter slats will feature an interlocking end shoe to prevent side to side binding of the shutter door during operation. Slats must have interlocking joints with an inverted locking flange. Slat inner seal shall be a one piece PVC extrusion;

seal design will be such to prevent metal to metal contact while minimizing dirt and water from entering the compartment.

Shutter door track shall be one piece design with integral overlapping flange to provide a clean finished look without the need of caulk. Door track shall feature an extruded Santoprene rubber double lip low profile side seal with a silicone co-extruded back to reduce friction during shutter operation.

Shutter bottom rail shall be a one piece double wall extrusion with integrated finger pull. Finger pull shall be curved upward with a linear striated surface to improve operator grip while operating the shutter door. Bottom rail shall have a smooth contoured interior surface to prevent loose equipment from jamming the shutter door. Bottom rail seal shall be made from Santoprene; it will be a double “V” seal to prevent water and debris from entering compartment. Bottom rail lift bar shall be a one piece “D” shaped aluminum extrusion with linear striations to improve operator grip during operation. Lift bar shall have a wall thickness of 0.125”. Lift bar shall be supported by no less than two pivot blocks; pivot blocks shall be constructed from Type 66 Glass filled reinforced nylon for superior strength. Bottom rail end blocks shall have incorporated drain holes which will allow any moisture that collects inside the extrusion to drain out.

Shutter door shall have an enclosed counter balance system. Counter balance system shall be 4” in diameter and held in place by 2 heavy duty 18 gauge zinc plated plates. Counter balance system shall have 2 over-molded rubber guide wheels to provide a smooth transition from vertical track to counter balance system; no foam material of any kind shall be permitted or used in this area.

The shutter door assembly shall be manufactured and assembled in the United States.

There shall be an aluminum drip rail above each compartment door with a built in replaceable wiper seal.
There shall be an anodized aluminum sill plate installed over the compartment door.

The side compartment roll-up door slats and doorframe extrusions shall be finish painted to match the body.

PULL DOWN STRAPS, COMPARTMENT DOOR

There shall be four (4) pull-down straps provided on the high side compartment doors to aid in closing the doors.

COMPARTMENTS, RIGHT SIDE

R2
There shall be a right front compartment installed ahead of the rear axle. This compartment shall have one-(1) roll up door. The compartment shall be approximately 57" wide x 70" high x 28" deep. The compartment shall have a useable door opening of approximately 54" wide x 61" high.

R3
There shall be one-(1) compartment installed above the wheel well. This compartment shall have one-(1) roll up door. The compartment shall be approximately 58" wide x 38" high x 28" deep. The compartment shall have a useable door opening of approximately 55" wide x 29" high.

R4
There shall be one-(1) right rear compartment installed behind the rear axle. This compartment shall have one-(1) roll up door. The compartment shall be approximately 59" wide x 70" high x transverse in the lower section and 28" deep in the upper section. The compartment shall have a useable door opening of approximately 56" wide x 61" high.

COMPARTMENT DOORS, RIGHT SIDE ROLL UP

R•O•M or equivalent Series IV roll-up shutter doors shall be installed on the right side compartments of

the apparatus as specified.

Shutter slats will feature a double wall extrusion 0.315" thick with a concave interior surface to minimize loose equipment jamming the shutter door closed. Shutter slats will feature an interlocking end shoe to prevent side to side binding of the shutter door during operation. Slats must have interlocking joints with an inverted locking flange. Slat inner seal shall be a one piece PVC extrusion; seal design will be such to prevent metal to metal contact while minimizing dirt and water from entering the compartment.

Shutter door track shall be one piece design with integral overlapping flange to provide a clean finished look without the need of caulk. Door track shall feature an extruded Santoprene rubber double lip low profile side seal with a silicone co-extruded back to reduce friction during shutter operation.

Shutter bottom rail shall be a one piece double wall extrusion with integrated finger pull. Finger pull shall be curved upward with a linear striated surface to improve operator grip while operating the shutter door. Bottom rail shall have a smooth contoured interior surface to prevent loose equipment from jamming the shutter door. Bottom rail seal shall be made from Santoprene; it will be a double "V" seal to prevent water and debris from entering compartment. Bottom rail lift bar shall be a one piece "D" shaped aluminum extrusion with linear striations to improve operator grip during operation. Lift bar shall have a wall thickness of 0.125". Lift bar shall be supported by no less than two pivot blocks; pivot blocks shall be constructed from Type 66 Glass filled reinforced nylon for superior strength. Bottom rail end blocks shall have incorporated drain holes which will allow any moisture that collects inside the extrusion to drain out.

Shutter door shall have an enclosed counter balance system. Counter balance system shall be 4" in diameter and held in place by 2 heavy duty 18 gauge zinc plated plates. Counter balance system shall have 2 over-molded rubber guide wheels to provide a smooth transition from vertical track to counter balance system; no foam material of any kind shall be permitted or used in this area.

The shutter door assembly shall be manufactured and assembled in the United States.

There shall be an aluminum drip rail above each compartment door with a built in replaceable wiper seal.
There shall be an anodized aluminum sill plate installed over the compartment door.

The side compartment roll-up door slats and doorframe extrusions shall be finish painted to match the body.

PULL DOWN STRAPS, COMPARTMENT DOOR

There shall be four (4) pull-down straps provided on the high side compartment doors to aid in closing the doors.

COMPARTMENT, CENTER REAR

B1
There shall be one-(1) compartment installed at the center rear of the apparatus. This compartment shall have one-(1) roll up door. The compartment shall have a useable door opening of approximately 42" wide x full height.

COMPARTMENT DOOR, REAR ROLL UP

A R•O•M or equivalent Series IV roll-up shutter doors shall be installed on the rear compartment of the apparatus.

Shutter slats will feature a double wall extrusion 0.315" thick with a concave interior surface to minimize loose equipment jamming the shutter door closed. Shutter slats will feature an interlocking end shoe to prevent side to side binding of the shutter door during operation. Slats must have

interlocking joints with an inverted locking flange. Slat inner seal shall be a one piece PVC extrusion; seal design will be such to prevent metal to metal contact while minimizing dirt and water from entering the compartment.

Shutter door track shall be one piece design with integral overlapping flange to provide a clean finished look without the need of caulk. Door track shall feature an extruded Santoprene rubber double lip low profile side seal with a silicone co-extruded back to reduce friction during shutter operation.

Shutter bottom rail shall be a one piece double wall extrusion with integrated finger pull. Finger pull shall be curved upward with a linear striated surface to improve operator grip while operating the shutter door. Bottom rail shall have a smooth contoured interior surface to prevent loose equipment from jamming the shutter door. Bottom rail seal shall be made from Santoprene; it will be a double “V” seal to prevent water and debris from entering compartment. Bottom rail lift bar shall be a one piece “D” shaped aluminum extrusion with linear striations to improve operator grip during operation. Lift bar shall have a wall thickness of 0.125”. Lift bar shall be supported by no less than two pivot blocks; pivot blocks shall be constructed from Type 66 Glass filled reinforced nylon for superior strength. Bottom rail end blocks shall have incorporated drain holes which will allow any moisture that collects inside the extrusion to drain out.

Shutter door shall have an enclosed counter balance system. Counter balance system shall be 4” in diameter and held in place by 2 heavy duty 18 gauge zinc plated plates. Counter balance system shall have 2 over-molded rubber guide wheels to provide a smooth transition from vertical track to counter balance system; no foam material of any kind shall be permitted or used in this area.

The shutter door assembly shall be manufactured and assembled in the United States.

There shall be an anodized aluminum sill plate installed over the compartment door.

The rear compartment roll-up door slats and doorframe extrusions shall be finish painted to match the body.

PULL DOWN STRAP, COMPARTMENT DOOR

There shall be a pull-down strap provided on the rear compartment door to aid in closing the door.

REAR BODY CONSTRUCTION, FLAT BACK DESIGN

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

COMPARTMENTS, ROOF TOP STORAGE

Six-(6) roof top compartments shall be installed, three-(3) each side of the upper body. The compartments shall be constructed from same material as the body and shall be integral with the body. Each compartment shall have a door constructed from aluminum tread plate. The doors shall have a stainless steel piano type hinge and chest style latch. The interior compartment dimensions shall be determined by customer requirements for equipment storage and engineering. Compartments shall have a 1/2" flange around the opening to prevent water from entering the compartment when the door is closed. The doors shall be held open with gas shocks.

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

The right side compartments are slightly smaller to allow for a landing area above the rear access ladder.

HARD SUCTION STORAGE DOOR

There shall be a horizontally hinged tread plate door mounted on the rearward end of the right side coffin compartments to slide hard suction hoses into the compartments.

VERTICAL LOAD TEST, APPARATUS BODY

The fire body shall exceed a vertical load testing. The vertical load test to the fire body shall follow the same strict and detailed requirements as applied to the cab.

The fire body shall be placed under a vertical load test to show structural integrity.There shall be no structure failures to the body and body compartments.

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

FULL DEPTH COMPARTMENTS

The specified compartments of the apparatus shall have full-depth configurations that extend the interior depth of the compartment to match to lower compartment depths. The exact dimensions and storage capacity is completely described in the "Compartment" section of the specification.

Compartments L1, L2, L3, L4, R1, R2, R3, and R4 shall be full depth.

COMPARTMENT, LADDER STORAGE

A rear, ladder storage compartment shall be configured through the center of the polypropylene tank. The ladder storage area shall be designed to completely enclose and protect the contents.

The rectangular storage compartment shall be fabricated entirely of polypropylene. The tunnel shall extend the length of the tank and completely supported from within the tank. External supports shall not be permitted. The sidewalls and top of the tunnel shall be constructed of 1/2" (.500") thick polypropylene. The floor of the tunnel shall be constructed of 3/4" (.750") thick polypropylene. All four sides shall be internally welded to the tank structure. The tunnel floor shall provide a surface, which is smooth and free of any obstructions, which would prevent the unencumbered removal of stored equipment.

A ladder storage compartment constructed of 3/16" (.1875") thick 5052-H32 Marine grade aluminum and designed to accommodate one (1) 24' extension ladder, one (1) 14' roof ladder, one (1) 10' aluminum folding attic ladder and up to four (4) pike poles, shall be installed in the tank sleeve. The ladder storage compartment shall be appropriately sectioned utilizing 3/16" (.1875") thick Marine grade aluminum. The floor of the partitions shall be overlaid with polypropylene to facilitate individual removal of the contents. The individual pike poles tubes shall be manufactured from aluminum, and shall be easily removable in the event that service to the water tank is necessary.

Access to the compartment shall be gained through a horizontally hinged, lift up style compartment door, located at the rear of the vehicle. The outer door shall be constructed of 3/16" (.1875") thick smooth aluminum plate and the inner pan constructed from 1/8" (.125") thick smooth aluminum plate. There shall be a 1/4" (.250") hole installed in the lower corners of the inside door pans for drainage. The doors shall have a closed cell neoprene rubber gasket installed around the perimeter of the door to carry off water. The door shall have one (1) D-paddle handle with rotary latch mechanism, and pneumatic door stay device. The door striker shall be offset to improve the storing and removal of equipment. The door shall have a continuous stainless steel piano hinge bolted to the body and door with stainless steel hardware.

STORAGE TUBES, PIKE POLE

Three-(3) aluminum tubes shall be installed on the apparatus for pike pole storage. One-(1) end shall be notched to allow the poles to be locked in place.

COMPARTMENT, SPEEDY DRY STORAGE

One-(1) dry chute dispenser labeled “Speedy Dry” shall be installed from the roof top compartment to

below the side rear compartment fabricated from aluminum tubing and formed aluminum plate. A sliding push-pull handle labeled “Pull to open” shall be installed between the upper and lower tubing accessed from inside the lower compartment allowing the material to be dispensed below the vehicle while in the "Open" position. An angled bucket constructed from formed aluminum plate shall be installed in the roof top compartment housing the opened material.

STORAGE MODULE, BACKBOARD

There shall be a backboard storage module located within the upper section pump panel compartments. This backboard module shall be constructed from welded 3/16" thick smooth aluminum plate, complete with welded partitions. The module shall be designed to carry three-(3) backboards. Each opening shall be approximately 3" high x 18" wide x 72" deep. This module shall contain approximately 6-3/4 cubic feet of storage. The outer left and right sections shall be welded to the body structure. The center section shall be completely removable for improved pump service access. The center section shall slide out with the release of two-(2) stainless steel butterfly latches.

Location: Above pump panel.

EQUIPMENT RACK, AIR BAG STORAGE

There shall be one-(1) equipment storage rack fabricated from aluminum for store air bags. The location of the storage rack shall be determined by the Fire Department.

Location: Compartment R3, to left of storage module.

STORAGE MODULE, CHAIN SAW

There shall be one (1) saw storage module located in the specified compartment to hold two-(2) chain saws. The module shall be fabricated from 1/8" smooth aluminum and shall be painted with a gray ruggedized coating.

The module shall be angled to allow for additional storage. The front of the module shall have two-(2) lift up doors to access the additional storage area. The outside of each door shall be equipped with a fabricated saw mount and two-(2) chrome dog bone handles.

Location: Compartment L4. Mounted high and to the left.

STORAGE MODULE, COMPARTMENT L3

There shall be a storage module located in compartment L3. The module shall be fabricated from 1/8" smooth aluminum and shall be painted with dark gray ruggedized coating.

The module shall be divided into eleven-(11) separate storage areas for miscellaneous equipment.

There shall be two-(2) tubes installed in the module for storage of D-size Oxygen cylinders.

STORAGE MODULE, COMPARTMENT R2

There shall be a storage module located in compartment R2. The module shall be fabricated from 1/8" smooth aluminum and shall be painted with dark gray ruggedized coating.

The module shall be divided into twelve-(12) separate storage areas for miscellaneous equipment.

STORAGE MODULE, COMPARTMENT R3

There shall be a storage module located in compartment R3. The module shall be fabricated from 1/8" smooth aluminum and shall be painted with dark gray ruggedized coating.

The module shall be divided into seven-(7) separate storage areas for miscellaneous equipment.

WHEEL WELL AIR BOTTLE COMPARTMENT, LEFT FRONT

There shall be an aluminum air bottle compartment located in the left front body wheel well to house two-(2) spare SCBA cylinders. 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.

WHEEL WELL AIR BOTTLE COMPARTMENT, LEFT REAR

There shall be an aluminum air bottle compartment located in the left rear body wheel well to house two-(2) spare SCBA cylinders. 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.

WHEEL WELL AIR BOTTLE COMPARTMENT, RIGHT FRONT

There shall be an aluminum air bottle compartment located in the right front body wheel well right front to house two-(2) spare SCBA cylinders. 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.

WHEEL WELL AIR BOTTLE COMPARTMENT, RIGHT REAR

There shall be an aluminum air bottle compartment located in the right rear body wheel well to house two-(2) spare SCBA cylinders. 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.

DOORS, WHEEL WELL COMPARTMENTS

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

BODY TRIM

The standard body trim shall include the following:

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

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

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

Two-(2) handrails shall be located on the rear of the apparatus, one-(1) handrail per side. Each handrail shall be constructed of 1-1/4" knurled aluminum. The handrails shall be mounted with chrome plated end stanchions. Each handrail shall be sufficient in length to meet all standard requirements.

FUEL FILL, RECESSED WITH DOOR

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

MUD FLAPS, REAR

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

RUBRAIL

There shall be an aluminum rubrail installed on both sides of the lower body compartments. The rubrail shall be constructed from "C" channel extrusion. The aluminum rubrail shall be bolted in place with stainless steel bolts, and spaced from the fire body to provide body protection. The solid rubrail shall serve as protection to the side doors when encountering close objects. Tread plate rubrails or welded on shall not be acceptable.

REAR STEP

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

All running board and step surfaces shall comply with NFPA 1901.

ACCESS LADDER, REAR

There shall be one-(1) Zico Quic-Ladder or equivalent model 3096 with a two-rung fold-down section and six-rung main ladder section. The ladder shall be cast aluminum with a flat, non-skid surface for traction. Each step shall be 3” deep x 15-1/2” wide. The handrails shall be 1-1/4” heavy-walled aluminum tubing, covered between the rungs with ribbed black neoprene.

TOW EYES, REAR

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

HANDRAIL, BELOW HOSE BED

There shall be an intermediate handrail installed on the apparatus below the hose bed. The handrail shall be constructed of 1-1/4" knurled aluminum. The handrail shall be mounted with chrome plated end stanchions.

HOSE BED DIVIDER

One (1) hose bed divider shall be manufactured from 1/4" (.250") smooth aluminum plate with an extruded aluminum base welded to the bottom. The divider shall have an extruded track to slide in to allow the hose bed to adjust for different hose capacities. One end of the divider shall have a 3" radius corner. The divider shall be sanded to prevent damage to hose.

HOSE BED COVER

A 1/8" (.125") aluminum tread plate hose bed cover shall be provided. The cover shall be two-(2) doors with continuous stainless steel hinge along each side. The hose bed cover shall have aluminum assist handles and door hold open springs. An open door indicator switch shall be provided and wired the open door indicator system in the cab.

Two-(2) Hypalon end flaps shall be provided at the rear of the apparatus. The flaps shall be constructed of 16 oz. heavy-duty, fire retardant Hypalon.

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

The covers shall be wired the door ajar system.

The hypalon end flaps shall be secured at the bottom using snaps and Velcro. The end flaps shall completely protect the hose and prevent the hose from inadvertently deploying during normal operation.

The cover shall meet the TIA 03-1 NFPA requirement.

The covers shall be red in color.

HOSE BED CAPACITY

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

400' 2.5" DJ Hose
800' 5" LDH
400' 2.5" DJ Hose

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

COMPARTMENT UNISTRUTS

One (1) set of aluminum unistruts shall be installed in the compartment specified by the department for future installation of shelves or to allow the specified trays/tool boards to be adjustable.

Location: Compartment L2 for tool boards.

SHELF, ADJUSTABLE

There shall be one (1) adjustable shelf constructed from 3/16" (.1875) smooth aluminum. The shelf shall be approximately 0-28"W x 24-28"D. The adjustable track shall be made from aluminum extrusions. Each shelf shall have a 2" lip on all sides for additional strength.
Location: Compartment L2, to right of partition, above roll out tray.

SHELF, ADJUSTABLE

There shall be two (2) adjustable shelves constructed from 3/16" (.1875") smooth aluminum. The shelf shall be approximately 37-48"W x 24-28"D. The adjustable track shall be made from aluminum extrusions. Each shelf shall have a 2" lip on all sides for additional strength.

Location: One (1) in compartment L4, to left of partition.

One (1) in compartment R4, to left of partition.

TRAY, 250 POUND ROLL OUT

There shall be one (1) roll-out tray supplied, constructed from smooth aluminum plate. The tray shall be approximately 0-18"W x 24-28"D. The tray shall have a 3" lip on all sides for additional strength. The tray shall be mounted on Grant slides with a combined capacity of 250 pounds.

Location: Compartment L2, adjustable mounted upside down to right of partition

TRAY, 250 POUND ROLL OUT

There shall be one (1) roll-out tray supplied, constructed from smooth aluminum plate.

The tray shall be approximately 37-48"W x 45"D. The tray shall have a 3" lip on all sides for additional strength. The tray shall be mounted on Grant slides with a combined capacity of 250 pounds.

Location: Compartment B1, floor mounted.

TRAYS, 500 POUND ROLL OUT

There shall be two (2) roll-out trays supplied, constructed from smooth aluminum plate. The tray shall be approximately 37-48"W x 24-28"D. The trays shall have a 3" lip on all sides for additional strength. The trays shall be mounted on Slide Master Slides with a combined capacity of 500 pounds.

Location: Compartment R4 to left. One shall be floor mounted and one shall be mounted near top with hydraulic reels mounted on underside of it.

TOOL BOARDS, VERTICAL ROLL OUT

There shall be three (3) vertical tool boards mounted in a specified compartment. Each tool board shall be manufactured from smooth aluminum plate. The tool boards shall be approximately 24-28"D x full height and designed to extend 100% of the slide length. One (1) set of Grant or equivalent 250# slides shall be installed per tool board.

Location: Two (2) in compartment L2 adjustable, to left of partition.

One (1) in compartment R4, at forward wall.

TOOL BOARD, VERTICAL ROLL OUT

There shall be one (1) vertical tool board mounted in a specified compartment. Each tool board shall be manufactured from smooth aluminum plate. The tool board shall be approximately 24-28"D x 0-27"H and designed to extend 100% of the slide length. One (1) set of Grant or equivalent 250# slides shall be installed per tool board.

Location: Compartment L4, in upper right corner like MVP demos

STORAGE POCKETS, VERTICAL TOOL BOARD

There shall be five (5) 6" deep storage pockets installed at the bottom of the specified vertical slide out tool boards.

COMPARTMENT DIVIDERS

Five (5) compartment dividers shall be mounted in the specified compartment. The divider shall be constructed of 3/16" (.1875") smooth aluminum plate.

Location: One (1) in compartment L2, 18" from rearward wall.

One (1) in compartment R4, 12" from forward wall.

Two (2) in compartment R2, one beside fill station, the other approx. 12" to the left to make a slot for Little Giant Ladder.

One (1) in compartment L4, 10" from rearward wall.

ELECTRICAL SYSTEM

BODY ELECTRICAL

The body electrical system shall be designed as an integrated electrical package specifically engineered for fire apparatus application. The integrated electrical system shall be comprised of power distribution panels, which interface to the body and chassis through an engineered harnessing system.

All chassis wiring shall be type "GXL" in accordance with S.A.E. J1128 and NFPA-1901. Wiring shall be color coded and include function codes every three-(3) inches on both sides.

The electrical wiring harness shall be covered by a black split convoluted loom, rated at a minimum of 275º F.

DISTRIBUTION PANELS

The electrical distribution panels and circuits must be housed in each rear corner compartment or extrusion. The distribution panel shall incorporate a power and ground stud for connection to the internal circuits.

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

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

Each side electrical distribution panel shall consist of fifteen-(15) power distribution relays. The power distribution relays shall be replaceable, SPDT automotive style, rated at a minimum of 30 amperes.

The power distribution relays shall incorporate separate inputs, which are able to accept outputs from a load management system. The load management inputs must allow for the addition of a load management system before, during or after the time of delivery without requiring a rewiring of the existing distribution panel circuits.

Connections to the distribution panel shall utilize Deutsch style bulkhead connectors. Screw clamp type connections are not acceptable.

The distribution panel shall also contain circuit's ancillary to the required DOT signals and other body functions.

The complete body electrical system shall be 100% documented and contain independent circuit diagrams with point to point wiring information, as shall as a general component diagram included in the apparatus manual.

The body electrical panel shall be capable of being completely disconnected and fully tested by a computerized circuit analyzer.

All electrical equipment switches shall be mounted on a switch panel mounted in the cab convenient to the driver. Light switches shall be of the marine grade rocker type with integral indicator light to show when lights are energized. All switches shall be appropriately identified.

12-VOLT TESTING

The apparatus low voltage system shall be tested and certified. A copy of certification shall be provided to the purchaser with the apparatus.

Reserve Capacity Test
The unit shall be run until all engines, engine compartment temperatures are stabilized and the battery system is fully charged. The engine shall be shut off and the minimum continuous electrical load be activated for ten-(10) minutes. All electrical loads shall be shutoff after ten-(10) minutes and the battery system shall then be capable of restarting the engine.

Alternator Performance Test at Idle
Minimum continuous electrical loads shall be activated while the unit is at idle speed.

Alternator Performance Test at Full Load

The total continuous electrical load shall be activated with the engine running up to the manufacturer's governed speed. The test duration shall be a minimum of two-(2) hours. Activation of the load management system shall 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, shall be considered a test failure.

Low Voltage Alarm Test
The engine shall be shut off and the total continuous electrical load shall be activated and continue to be applied until the excessive battery discharge alarm activates. The test shall be considered a failure if the alarm has not sounded within 140 seconds after the voltage drops to 11.8 volts.

WIRING PROTECTION

All 12-volt wiring shall be run in high temperature, rated at a minimum of 275º F, split loom for easy access to wires when trouble shooting.

EMI/RFI PROTECTION

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

The apparatus shall have the ability to operate in typical fire and rescue situations with no adverse effects from EMI and/or RFI.

The apparatus shall utilize components that are fully protected and wiring that utilizes shielding and loop backgrounds where required to control EMI/RFI susceptibility. The apparatus shall 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 shall 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.

LIGHTS, 26" LED COMPARTMENT

Four (4) On Scene Solutions or equivalent "Access Series" 26" LED lights shall be provided with 15 HB, surface mount LED's per 10" light section and produce a minimum of 200 lumens per 10" length. Each "Access Series" shall be capable of operating at a voltage of 9VDC to 14VDC. Each "Access Series" shall be cuttable in 2" increments and feature a high quality, impact resistant Lexan™ enclosure.

The light stick shall be waterproof and rated at 100,000 hours of service. Each light stick shall be provided with a 5 year free replacement warranty.

Location: Two (2) in compartments L3 and R3.

LIGHTS, 56" LED COMPARTMENT

Two (2) On Scene Solutions or equivalent "Access Series" 56" LED lights shall be provided with 15 HB, surface mount LED's per 10" light section and produce a minimum of 200 lumens per 10" length. Each "Access Series" shall be capable of operating at a voltage of 9VDC to 14VDC. Each "Access Series" shall be cuttable in 2" increments and feature a high quality, impact resistant Lexan™ enclosure.

The light stick shall be waterproof and rated at 100,000 hours of service. Each light stick shall be provided with a 5 year free replacement warranty.

Location: Compartment B1.

LIGHTS, 58" LED COMPARTMENT

Twelve (12) On Scene Solutions or equivalent "Access Series" 58" LED lights shall be provided with 15 HB, surface mount LED's per 10" light section and produce a minimum of 200 lumens per 10" length. Each "Access Series" shall be capable of operating at a voltage of 9VDC to 14VDC. Each "Access Series" shall be cuttable in 2" increments and feature a high quality, impact resistant Lexan™ enclosure.

The light stick shall be waterproof and rated at 100,000 hours of service. Each light stick shall be provided with a 5 year free replacement warranty.

Location: Two (2) in compartments L1, L2, L4, R1, R2, and R4.

DOOR AJAR SWITCHES

All apparatus body doors shall be provided with an auto door switch. These switches shall operate the compartment interior lights and activate the door ajar indicator on each side of apparatus body when the door is opened. There shall be a red door ajar light mounted in the cab, in view of the driver to indicate an unsecured door. There shall be a buzzer mounted in the cab that shall alert the driver.

LIGHTBAR, 81" WHELEN FREEDOM IV

A Whelen or equivalent Edge Ultra Freedom IV Linear Super-LED LC Series 81" lightbar model F4N1QLED shall be provided. The F4N1QLED lightbar shall incorporate an anodized extruded heavy duty aluminum base and cover chassis with two front red corner modules with two red endcap modules, two interior white modules, and twelve interior red modules. The front of each corner module shall consist of 12 red Linear Super-LEDs installed on a conformal coated PCB board with a thermal pad/aluminum bracket heat sink assembly. The short red endcap Linear Super-LED lights shall incorporate six red Super-LED installed on a conformal coated PCB board with a thermal pad/aluminum bracket heat sink assembly. The long red interior Linear Super-LED lights shall incorporate 12 red Super-LED installed on a conformal coated PCB board with a thermal pad/aluminum bracket heat sink assembly. The long white interior Linear Super-LED lights shall incorporate 12 white Super-LEDs installed on a conformal coated PCB board with a thermal pad/aluminum bracket heat sink assembly. The all modules will utilize a Diamond Optix™ metalized reflector and two optic collimators. All electronic components shall be conformal coated to provide additional protection. The outer lens construction shall consist of two clear Uni-Dome top lenses with a clear center lens and utilize two liquid injection molded wiper seal dividers for maximum protection against environmental elements. Metal top shields installed on the Uni-Domes and center lens shall provide protection from climatic conditions and provides passive solar radiation to direct heat away from internal components.

The F4N1QLED shall have an electronic LC I/O board. The solid state I/O board shall be microprocessor controlled. The I/O board shall have built-in reverse polarity protection and output-short protection. The I/O board shall have the ability to flash twenty two Super-LED warning lights. There shall be a data bank of 12 Scan-Lock™ flash patterns including steady burn with low power and cruise light functions. The cruise light function shall allow the user the four corner modules as marker courtesy lights. The F4N1QLED will have the capability to install a traffic advisor in the rear of the lightbar. The I/O board shall also have outputs to add takedown, alley lights, and auxiliary lights for each set of lights to be controlled in pairs.

All lightheads shall be installed in the F4N1QLED with the aid of black polycarbonate snap-in mounting brackets. The solid state lightbar shall be vibration resistant. The lightbar will contain a 17' 2/c 8GA unterminated power cable and 17' 17/c 22GA unterminated control cable. All electronic components are covered by a five year factory warranty. The F4N1QLED shall include a permanent mount kit with hardware.

The lightbar shall be controlled in the following manner:

Calling for Right of Way - All Positions
Blocking Right of Way - Clear shall not be Active

The lights shall be activated by a single emergency light switch located on the master light switch panel in the cab.

The lightbar shall meet NFPA 1901 edition as configured.

LIGHTS, ZONE B/D UPPER FRONT BODY

Two-(2) Whelen or equivalent M6 Series Super-LED model M6R shall be installed, one-(1) each side of the upper front corner of the body. The warning light shall 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 shall provide extended life/luster protection against UV and chemical stresses. The encapsulated lens/reflector assembly and conformal coated PC board shall provide additional protection against environmental elements. The solid state warning lights shall be vibration resistant. The self-contained flashing light shall 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.

LIGHTS, ZONE B/D UPPER REAR BODY

Two-(2) Whelen or equivalent M6 Series Super-LED model M6R shall be installed, one-(1) each side of the upper rear corner of the body. The warning light shall 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 shall provide extended life/luster protection against UV and chemical stresses. The encapsulated lens/reflector assembly and conformal coated PC board shall provide additional protection against environmental elements. The solid state warning lights shall be vibration resistant. The self-contained flashing light shall 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.

LIGHTS, ZONE C UPPER OUTBOARD

Two-(2) Whelen or equivalent M6 Series Super-LED model M6R shall be installed, one-(1) each side on the upper rear of the apparatus in the outboard position. The warning light shall 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 shall provide extended life/luster protection against UV and chemical stresses. The encapsulated lens/reflector assembly and conformal coated PC board shall provide additional protection against environmental elements. The solid state warning lights shall be vibration resistant. The self-contained flashing light shall 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.

LIGHTS, ZONE C UPPER MIDDLE

Two-(2) Whelen or equivalent M6 Series Super-LED model M6A shall be installed, one-(1) each side on the upper rear of the apparatus in the middle position. The warning light shall incorporate amber Super-LEDs, an amber non-optic hard coated polycarbonate lens, clear optic collimator and utilize a metalized reflector for maximum output. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The encapsulated lens/reflector assembly and conformal coated PC board shall provide additional protection against environmental elements. The solid state warning lights shall be vibration resistant. The self-contained flashing light shall 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.

LIGHTS, ZONE B/D FRONT LOWER

Two-(2) Whelen or equivalent M6 Series Super-LED model M6R lights shall be installed, one-(1) each side forward portion of the apparatus. The warning light shall 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 shall provide extended life/luster protection against UV and chemical stresses. The encapsulated lens/reflector assembly and conformal coated PC board shall provide additional protection against environmental elements. The solid state warning lights shall be vibration resistant. The self-contained flashing light shall 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.

LIGHTS, ZONE B/D MIDSHIP LOWER

Two-(2) Whelen or equivalent M6 Series Super-LED model M6R lights shall be installed, one-(1) each side midship of the apparatus. The warning light shall 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 shall provide extended life/luster protection against UV and chemical stresses. The encapsulated lens/reflector assembly and conformal coated PC board shall provide additional protection against environmental elements. The solid state warning lights shall be vibration resistant. The self-contained flashing light shall 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.

LIGHTS, ZONE B/D REAR LOWER

Two-(2) Whelen or equivalent TIR6 Series Super-LED model 50R03ZRR lights shall be installed, one-(1) each side rearward portion of the apparatus. The warning lights shall incorporate red Linear Super-LEDs, a red optic hard coated polycarbonate lens. The surface mount module includes a chrome flange and hardware for horizontal mounting.

LIGHTS, ZONE C LOWER

Two-(2) Whelen or equivalent M6 Series Super-LED model M6R shall be installed, one-(1) each side on the lower rear of the apparatus. The warning light shall 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 shall provide extended life/luster protection against UV and chemical stresses. The encapsulated lens/reflector assembly and conformal coated PC board shall provide additional protection against environmental elements. The solid state warning lights shall be vibration resistant. The self-contained flashing light shall have 164 Scan-Lock flash patterns including synchronize feature and steady burn. The warning light is covered by a five year factory warranty.

STOP, TURN AND BACK-UP LIGHTS

Stop, turn and backup lights shall be Whelen or equivalent M6 Series, individual fixtures. The red stop (LED) light shall be model M6BTT, the turn light shall be a model M6T amber (LED) type with directional arrow, and the backup light shall be a white (LED) model M6BUW.

HOUSING, REAR TAIL LIGHT ASSEMBLY

The fixtures shall be mounted on each rear face of the body in a model M6FCV4, four-(4) lighthead chrome housing.

LIGHT, REAR DIRECTIONAL

A Whelen or equivalent Traffic Advisor model TAM65 shall be provided. The traffic advisor shall incorporate a rectangular extruded black aluminum chassis with six amber TIR6™ Super-LED® lights. The TIR6 lights shall be installed with an amber optic hard coated polycarbonate lens. The TIR6 lights shall incorporate six amber Super-LEDs, a clear horizontal optic hard coated polycarbonate lens, and utilize a TIR reflector for maximum output. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The encapsulated TIR6 lens/reflector assembly and conformal coated PC board shall provide additional protection against environmental elements.

The solid state traffic advisor shall be vibration resistant. The TAM65 shall include model TACTLD1 control head that includes remote flash control. The TACTLD1 shall have four programmable

directional sequence flash patterns of left, right, split, and flash. The TACTLD1 includes an auxiliary flash option when attached to +12v DC to flash the traffic advisor. The LED display on the control head shall replicate the TAM65 directional sequence. The traffic advisor control head shall have a rear panel dip switch for the ability to set eight additional Scan-Lock™ flash patterns. The TAM65 will contain a 15' interconnecting cable with quick disconnect feature. The LED modules are covered by a five year factory warranty. The TAM65 shall have for mounting rear PEM nuts/thu-bolt end caps with hardware.

The rear directional light shall be recessed mounted in the body.

CLEARANCE LIGHTS AND REFLECTORS

Clearance lights and reflectors shall be LED lights, which include (2) red marker lights, (4) red rectangular reflectors, (2) amber rectangular reflectors and (1) red three light cluster recessed in the rear step.

LIGHTS, UNDERBODY

Five (5) Whelen or equivalent LED underbody "Ground Effect" light(s) shall be installed at a location to be determined by the Fire Department. The underbody light(s) shall illuminate the ground beneath the apparatus.

The 12v steady burn light(s) shall incorporate 12 clear LED and a clear optic hard coated polycarbonate lens. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The encapsulated coated PC board and lens fitted with foam in place gasket assembly shall provide additional protection against environmental elements. The solid state light shall be vibration resistant. The 20C0CDCD will contain 350 usable lumens. An installation kit including mounting hardware and rubber gasket shall be provided. The 20C0CDCD will contain a 12" terminated pigtail with a waterproof Deutsch® connector. The light is covered by a five year factory warranty.

The lights shall be controlled by a switch in the cab.

LIGHT, LICENSE PLATE

A Whelen or equivalent OS Series LED model 0SC0EDCR shall be provided at the rear of the apparatus to illuminate the license plate. The steady burn illumination light shall incorporate three clear LED and a clear non-optic hard coated polycarbonate lens. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The encapsulated assembly shall provide protection against environmental elements. The solid state illumination light shall be vibration resistant. An installation kit including mounting hardware, neoprene gasket and 45 degree angle chrome housing shall be provided for surface mounting. The 0AC0EDCR will contain a 12" non-terminated pigtail. The illumination light meets SAE J592 requirements and is covered by a five year factory warranty.
FRC

LIGHTS, 12-VOLT SURFACE MOUNT SCENE

Two (2) pair of Fire Research or equivalent Spectra LED model SPA260-Q15 surface mount lights shall be provided and installed. The lamphead mounting arm shall terminate in 3/4" NPT threads. Wiring shall extend from the lamphead mounting arm bottom.

The lamphead shall have sixty (60) ultra-bright white LEDs, 48 for flood lighting and 12 to provide a spot light beam pattern. It shall operate at 12/24 volts DC, draw 13/6.5 amps, and generate 15,000 lumens of light. The lamphead shall have a unique lens that directs flood lighting onto the work area and focuses the spot light beam into the distance. The lamphead angle of elevation shall be adjustable at a pivot in the mounting arm and the position locked with a round knurled locking knob. The lamphead shall be no more than 5 3/8" high by 14" wide by 3 3/4" deep and have a heat resistant handle. The lamphead and mounting arm shall be powder coated. The LED scene light shall be for fire service use.

The scene lights shall be installed, one-(1) each side of the body, centered.

The center side body mounted scene lights shall be controlled by individual scene light switches located in the cab labeled LEFT SCENE and RIGHT SCENE.

The scene lights shall be installed, one-(1) each side on the upper rear outboard corners of the body.

The upper rear body mounted scene lights shall be controlled by a scene light switch located in the cab labeled REAR SCENE and when the transmission is placed into reverse.

LIGHT TOWER

One (1) Knight 2 or equivalent, manufactured by Command Light, part number KL415D, light tower shall be provided for installation on the apparatus. The location of the light tower and its controls shall be installed according to instructions given by the customer and the requirements of the light tower manufacturer.

The light tower shall extend 87-1/2" above the mounting surface and shall extend to full upright position in less than 15 seconds. The overall size of nested light tower shall be approximately 33" wide x 47" long x 14" high and weigh approximately 165 pounds.

Light Tower Construction and Design:
The light tower assembly shall be of aluminum construction, with stainless steel shafts and bronze bushings for long life and low maintenance.

The electrically controlled unit shall not require usage of the vehicle's air supply for operation, thereby eliminating the chance for air leaks in the vehicle braking system. Hydraulic or pneumatic type floodlights are not acceptable alternatives to the specified all electric light tower.

The light tower shall be tested to in wind conditions of 90 mph (150 kph) minimum. Other type floodlights that have not been tested to these conditions are not acceptable.

The light tower shall be capable of overhanging the side or back of the vehicle to provide maximum illumination to the vicinity adjacent to the vehicle for the safety of emergency personnel in high traffic conditions. Any tower that is only capable of rotations at the top of a pole is not an acceptable alternative to the specified tower.

Light Tower Electrical System:
The light tower shall be a two-stage articulating device with a lighting bank on top of the second stage capable of continuous 360 degree rotation. The light shall be elevated by electric linear actuators, one (1) actuator shall elevate the light bank and one (1) actuator shall adjust the light bank angle from 0 to 110 degrees. Power for the light bank shall be supplied through power collecting rings thus allowing continuous 360 degree rotation in either direction.

The tower base shall have a light that illuminates the envelope of motion during any movement of the light tower mast as required by NFPA1901.

Light Tower Floodlights:

The Command Light shall be equipped with the following bank of floodlights:

Floodlight manufacturer:	Fire Research Corporation
Number of lamp heads:	Four (4) Spectra SPA100-Q20
Voltage:	12 VDC
Watts of each lamp head:	220 watt
Total watts of light tower:	880 watts
Amperage per lamp head:	18 amps
Total amperage of light tower:	100 amps
Total Lumens of light tower:	80,000 lumens

Configuration: The light heads shall be mounted in two (2) on each side of the light tower, giving two (2) vertical lines of two (2) when the lights are in the upright position.

CONTROLS, LIGHT TOWER

The light tower shall be controlled with a hand-held 15 foot umbilical line remote control. The storage station for the remote control unit shall be equipped with a button to activate the "Auto-Park" automatic nesting feature. The controls on the remote box shall be:

Switches, one-(1) for each light bank.
Switch for optional light bank rotation.
Switch for the optional strobe.
Switch for lamp tree rotation.
Switch for elevating lower stage.
Switch for elevating upper stage.
Indicator light to indicate when light bank is out of roof nest position.
Indicator light to indicate when light bank is rotated to proper nest position.

COLOR, LIGHT TOWER

The finish of the light tower shall be electrostatically powder coated gray.

SHIELD, LIGHT TOWER

The light tower shall be protected by an aluminum shield that is bolted to the cab roof. It shall be constructed of 1/8" painted smooth aluminum.

REEL, AIR

There shall be one (1) Hannay or equivalent model EFH1514-17-18, electric rewind air hose reels mounted in a location to be determined by the Fire Department and connected to the vehicle cascade system. The reels shall contain 200' of 3/8" air line.

The air reels shall be installed in the specified compartments.

Location: Compartment R2, up high, to the right of the partition.

HOSE/CORD ROLLERS

There shall 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

There shall be one (1) Hannay or equivalent hose/cord stop model HS-3 attached at the end of each hose/cord.

REELS, HYDRAULIC

There shall be two (2) Hannay or equivalent Model EF2014-17-18, electric rewind hydraulic hose reels mounted in a location to be determined by the Fire Department. The reel shall contain 100' of hydraulic hose, and a 4' lead whip line. The type and brand of tool must be specified.

HOSE, HYDRAULIC

The reels shall contain 100' of 10,500 PSI hydraulic hose, and a 4' lead whip line. The type and brand of rescue tools used must be specified by the Fire Department.

The hydraulic reels shall be installed in the specified compartments.

Location: Compartment R4, on the underside of the uppermost pull out tray.

HOSE/CORD ROLLERS

There shall be two (2) 4-way roller assemblies installed to guide the hose/cord on and off the spool to prevent chafing of the apparatus paint.

HOSE/CORD STOPS

There shall be two (2) Hannay or equivalent hose/cord stops model HS-3 attached at the end of each hose/cord.

CASCADE SYSTEM

A breathing air or equivalent cascade system shall be supplied for filling of SCBA cylinders. The system shall include the following components:

Storage cylinders- specify number of bottles, and DOT or ASME
Cascading Air Control Panel
All necessary fittings and hose to operate cascading type system

The system shall meet NFPA 1901.

CASCADE AIR CONTROL PANEL

A control panel shall be supplied for filling SCBA/SCUBA cylinders. The control panel is designed for use with an eight bank storage system. The control panel constructed of 1/8" swirled stainless steel shall include a valve and gauge for each bank in the storage system, an adjustable pressure reducing regulator with a supply pressure gauge and a regulated pressure gauge for filling the different types/pressures of cylinders, a SCBA fill pressure gauge to indicate the pressure in the SCBA /SCUBA cylinder being refilled, an inlet fitting with a control valve for refilling the cascade system without have to disassemble any of the system and a valve outlet for connecting to the SCBA /SCUBA fill enclosure.

Location: Compartment R2, above fill station.

GAUGES

All gauges shall be 2-1/2" panel mounted gauges with a chrome plated brass bezel and shall be constructed of heavy brass cases with a brass bourdon tube and shall be glycerin filled.
All gauges shall have a "Grade A" rating with an accuracy of 1-1/2% full range. The gauges used for the individual storage banks shall have a 0-7500 PSI range. Gauges used for the supply pressure and regulated pressures on high pressure regulators (0-5000 psi outlet) shall have a 0-7500 PSI range. The gauge on the regulated pressure side of the high pressure regulator shall have "pies" on the gauges at 2216 PSI (yellow) and 4500 PSI (red) for ease of adjustment. The gauges used on low pressure regulators (0-400 PSI outlet) shall have a 0-600 PSI range on the regulated pressure side.

CONTROL VALVE

All control valves shall be rated at 6000 PSI working pressure with a 4:1 safety factor. The valves shall be constructed of chrome plated brass and shall be of the soft seat type with the seats being easily replaced without removing the valve from the panel or having to disturb any of the plumbing. The valves shall be the metering type valve for ease of flow control. The valves shall have a non-rising stem and shall be easily turned at the rated working pressure.

PRESSURE REGULATOR

The pressure reducing regulator shall be rated at 0-6000 PSI inlet and 0-5000 PSI outlet pressures. It shall be a self-relieving type regulator for ease of adjustment on the outlet side. There shall be a large adjusting knob on the regulator for adjusting anywhere between the range of 0-5000 PSI on the outlet side. There shall be a label affixed to the face of the adjusting knob indicating the direction to turn the

knob to increase or decrease pressure. There shall be a relief valve on the regulated side of the regulator that shall be set at 10% over the intended pressure of that outlet.

SYSTEM COMPONENTS & PERFORMANCE CRITERIA

The system refill connection on the control panel shall have a quick disconnect connection rated for 6000 PSI.

The inlet connections from the storage banks to the control panel shall be #4 JIC (37` flare) male connections.

All tube fittings used on the panel shall be rated at 6000 PSI minimum static pressure with a 4:1 safety factor.

All pipe fittings shall be rated at 6200 PSI minimum with a 4:1 safety factor.

All tubing connections on the control panel shall be constructed of 304 seamless stainless steel and shall be 1/4" I.D. X .049" wall thickness. The tubing shall have a working pressure of 7200 PSI with a 4:1 safety factor.

INTERCONNECTING HOSE/FITTINGS

All interconnecting hoses and fittings shall be included with the system. This shall include all hoses and fittings needed to connect the cylinder banks to the control panel. All flexible hose shall be thermoplastic with 3/16" I.D., and rated at 6000 PSI maximum working pressure. The hose shall have a 4:1 safety factor.

IDENTIFICATIONS TAGS AND WARNING LABELS

Appropriate tags and warning label shall be affixed where necessary for safety and proper operation of the control panel. Gauges, valves and other components that are relied upon for normal operation and monitoring of the control panel shall be identified with permanently affixed chrome bezel with color-coded labels.

STORAGE CYLINDERS

There shall be two (2) 6000 psi cylinders in the system. Each cylinder shall meet the following specifications.

DOT Classification: DOT -E- 9909-6000

Internal Diameter: 8-1/2"

Outside Diameter: 9-9/32"

Height: 55"

Weight (empty): 188 lbs.

Service Pressure: 6000 PSI

Air Capacity at Service Pressure @ 70 F: 509 cubic feet

Retest Period: Five (5) Years

CGA Outlet: 702

MOBILE FILL STATION

The fill enclosure shall be designed for mobile or in-house applications and have the ability to fill two-

(2) SCBA or SCUBA cylinders, either simultaneously or individually. A prototype of the fill station must have been tested under NFPA-1901 guide lines. A certification certificate shall be available upon request.

The unit shall be constructed of .25 inch plate steel. The fill enclosure door is constructed of .25 inch stainless steel. The cylinder holders shall be lined with a material to protect each cylinder from abrasion.

Access to the enclosure for filling cylinders shall be through a manually operated slide-up door and tilt-out bottle holder. Three (3) gas filled springs shall be provided to assist in the operation of the fill station door and cylinder holders. A mechanical twist latch shall be provided to secure the door in the closed position.

The loading position from a standard truck compartment floor to the center of the bottle valve shall be Approximately 13.6 inches in the lower holder and 23.5 inches in the upper holder.

The maximum length of either a SCBA or SCUBA bottle with the valve and fill adapter is 29 inches.

An Automatic, air operated, safety interlock system shall be provided to prevent the accidental filling of a cylinder until the door is completely closed and latched. Two fill hoses shall be provided each with stainless steel SCBA fill adaptors and bleeder, on/off valves shall also be provided and located inside the fill enclosure.

The fill station shall be designed so if a cylinder should rupture, rapidly expanding air is vented through an opening in the bottom of the enclosure and out through the compartment floor. A breakaway rubber seal shall be provided to seal the compartment floor.

The fill station shall be designed to conserve space and shall not exceed the following dimensions: 13.5” inches wide by 43”inches high by 23.5” inches deep. Note; the fill station door shall not exceed 53” inches high with the door in the open position.

The fill station shall not exceed 425 pounds.

Location: Compartment R2, close to the forward wall.

NFPA TEST, AIR SYSTEM

The complete air system shall be tested by the apparatus manufacturer/company, which installs the system. The results shall be provided to the purchaser at the time of delivery.
If the air system includes a compressor, the system shall be tested to ensure it meets or exceeds the requirements for air quality and output.

If the air system has an air purification component, the discharge air shall be tested to ensure it is of the proper grade and that the following contaminants are within acceptable levels: Carbon Monoxide, Carbon Dioxide, Moisture, Oil and Odor.

BODY PAINT FINISH, SINGLE COLOR

The apparatus body shall be painted with AkzoNobel Sikkens brand paint or **equivalent.** The paint process shall meet or exceed current state regulations concerning paint operations. Pollution control shall include measures to protect the atmosphere, water, and soil. Contractor shall, upon demand, provide evidence that the manufacturing facility is in compliance with State EPA rules and regulations.

The body exterior shall 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 shall be painted separately to assure proper paint coverage on body, door jambs and door edges.

Paint process shall feature AkzoNobel Sikkens high solid BTLV products and be performed in the following steps:

Corrosion Protection - all aluminum surfaces shall be treated with the AkzoNobel Sikkens LV 260 Epoxy coating to provide superior corrosion resistance and excellent adhesion of the base coat.

AkzoNobel Sikkens Sealer/Primer BTLV - acrylic urethane sealer/primer shall be applied to guarantee excellent gloss hold-out, chip resistance and a uniform base color.

AkzoNobel Sikkens High Solid BTLV650 (Base coat) - a lead-free, chromate-free high solid polyurethane base coat shall be applied, providing excellent coverage and durability. A minimum of two-(2) coats shall be applied.

AkzoNobel Sikkens High Solid BTLV650 (Clear coat) - high solid LV clear coat shall be applied as the final step in order to ensure full gloss and color retention and durability. A minimum of two-(2) coats shall be applied.

Any location where aluminum is penetrated after painting, for the purpose of mounting steps, hand rails, doors, lights, or other specified components shall be treated at the point of penetration with a corrosion inhibiting pre-treatment (ECK Corrosion Control). The pre-treatment shall 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 shall be individually treated with the corrosion inhibiting pre-treatment.
After the paint process is complete, the gloss rating of the unit shall be tested with a 60 degree gloss meter. Coating thickness shall be measured with a digital MIL gauge and the orange peel with a digital wave scan device.

BODY PAINT COLOR/CODE

The apparatus body paint code shall be red FLNA 31979.

PAINT, INTERIOR COMPARTMENT

The interior of the body compartments shall be painted with a ruggedized coating.

PAINT, INTERIOR COMPARTMENT HARDWARE

The interior body compartment shelves, trays, dividers, etc. shall be painted with dark gray ruggedized coating.

PAINT, EXTERIOR COMPONENTS
The following exterior components shall be painted with a black ruggedized coating:

- Front bumper
- Front bumper gravelshiled
- Front bumper compartments
- Front bumper compartment lid
- Front cab grille
- Front headlight bezels
- Cab lower steps
- Cab fenderettes
- Cab handrails & stanchions
- Cab side intake grille
- Cab roof treadplate
- Body rub rail
- Body finderettes
- Pull out steps
- Dunnage area
- Hose bed cover
- Coffin compartment covers
- Fuel fill door

- Rear tailboard
- Body handrails & stanchions
- Rear tail light bezels

SCOTCHLITE STRIPE

There shall be a 6" wide Scotchlite stripe, with an additional 1" wide stripe located above and below. The stripes shall be located no higher than 60" from the ground installed on the apparatus cab and body. The stripes shall cover a minimum of sixty percent (60%) of each side of the apparatus and forty percent (40%) of the front and rear of the apparatus. The stripe shall be installed to meet the current NFPA requirements.

The striping shall be black in color.

The pin/secondary stripe shall be black in color.

The reflective stripe shall run straight from the headlights to the front body compartments with a hockey stick design and run to the rear of the body on each side of the apparatus.

STRIPE, REAR CHEVERON

A minimum of fifty percent of the rear vertical surface of the unit shall 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 shall be 6” wide and the colors of stripping shall be in compliance, with the current edition of NFPA 1901.

The Chevron striping shall be 3M red and lime green.

LETTERING

Lettering and decals shall match the current fleet.

WARRANTY, BODY PARTS & LABOR

There shall be a two-(2) year body mechanical parts and labor warranty provided with the apparatus. The apparatus shall be free of defects in material and workmanship for a warranty period of two-(2) years after the date on which the apparatus is first delivered to the original purchaser.

WARRANTY, CAB/CHASSIS PARTS & LABOR

The manufacturer shall provide a limited parts and labor warranty to the purchaser of the cab and chassis for a period of two-(2) years or 24,000 miles, whichever occurs first. The warranty period shall commence on the date the vehicle is delivered to the end user.

WARRANTY, CAB STRUCTURAL

The cab structure shall be warranted for a period of ten-(10) years or one hundred thousand (100,000) miles which ever may occur first. The warranty period shall commence on the date the vehicle is delivered to the end user.

WARRANTY, BODY STRUCTURAL

There shall be a ten-(10) year body warranty on each new fire body/heavy-duty rescue apparatus. The bodies are to be free of structural failures caused by defective design or workmanship for a warranty period of ten-(10) years after the date on which the vehicle is first delivered to the original purchaser or 100,000 miles, whichever occurs first.

WARRANTY, CAB PAINT

The cab and chassis shall be covered by a limited manufacturer paint warranty which shall be in effect for ten-(10) years from the first owner's date of purchase or in service or the first 100,000 actual miles, whichever occurs first. The warranty period shall commence on the date the vehicle is delivered to the end user.

WARRANTY, BODY PAINT/CORROSION

There shall be a four-(4) year paint/corrosion warranty provided. This warranty shall cover perforation, blistering, peeling, or any other adhesion defects caused by defective manufacturing methods, or material selections, for a warranty period of four-(4) years or 100,000 miles which occurs first, after the date of which the vehicle is first delivered to the original purchaser.

WARRANTY, FRAME RAIL

The chassis frame and crossmembers shall be provided with a lifetime material and workmanship limited warranty to the original purchaser. The warranty shall cover the chassis frame and crossmembers as being free from defects in material and workmanship that would arise under normal use and service.

Proposals offering warranties for frames not including cross members shall not be considered.

WARRANTY, MERITOR AXLE

FRONT AXLE

The front axle shall be warranted for two-(2) years with unlimited miles under the general service application.

REAR AXLE

The rear axle shall be warranted for two-(2) years with unlimited miles under the general service application.

WARRANTY, DIESEL ENGINE

The engine shall be warranted for a period of five-(5) years or 100,000 miles, whichever occurs first.

WARRANTY, TRANSMISSION

The transmission shall be warranted for a period of five-(5) years with unlimited mileage. Parts and labor shall be included in the warranty.

WARRANTY, ANTI LOCK BRAKE SYSTEM

The ABS brake system shall be warranted for a period of three-(3) years/300,000 miles.

WARRANTY, HALE FIRE PUMP

EXPRESS WARRANTY
Will warrants to the original buyer that products manufactured by Hale are free of defects in material and workmanship for a period of five-(5) years from the date the product is first placed into service or five and one-half (5-1/2) years from date of shipment by manufacturer, whichever period shall be first to expire. Within this warranty period the manufacturer will cover parts and labor for the first two-(2) years and parts only for years three (3) through five (5).

LIMITATIONS
The manufacturer obligation is expressly conditioned on the Product being:

- Subjected to normal use and service
- Properly installed and maintained in accordance with the manufactures Instruction Manual and Industry Standards as to recommended service and procedures
- Not damaged due to abuse, misuse, negligence, or accidental causes
- Not altered, modified, serviced (non-routine), or repaired other than by an Authorized Service facility
- Manufactured per design and specifications submitted by the original buyer
- Used with an appropriate engine as determined by the engine manufacturers published data
- Excluded are normal wear items identified as but not limited to packing, strainers, anodes, filters, light bulbs, intake screens, wear rings, mechanical seals, etc.

WARRANTY, PLUMBING SYSTEM

There shall be a ten-(10) year pump plumbing warranty provided. The warranty covers all plumbing components used in construction of the fire apparatus water/foam plumbing system against defects and workmanship, provided the apparatus is used in a normal and reasonable manner. The warranty is extended only to the original user-purchaser for a period of 10 years from the date of delivery.

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 shall 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. Additional, this warranty is in lieu of all other obligations or liabilities on the part of the Manufacturer.

MANUAL, CHASSIS OPERATION

There shall be two-(2) digital copies of the chassis operation manual provided with the chassis. The digital data shall include a parts list specific to the chassis model.

MANUALS, ENGINE AND TRANSMISSION OPERATION

There shall 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 shall 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 shall address at least the inspection, service, and operations of the fire apparatus and all major components thereof.

MANUALS, FIRE PUMP

There shall 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 shall 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.

NFPA REQUIRED EQUIPMENT, FD SUPPLIED

The loose equipment as outlined in NFPA 1901, 2016 edition, section 5.9 thru 5.9.4 shall be provided by the fire department unless it is listed in this proposal. All loose equipment shall be installed on the apparatus before placed in emergency service, unless the Fire Department authorized agent signs the State of Exception as listed in the NFPA 1901 Standard for Automotive Fire Apparatus sections 4.21 thru 4.21.2.

LADDER, 10' FOLDING

There shall be one (1) Duo-Safety or equivalent Model 585-A, 10' folding ladder provided with the apparatus. The ladder shall be aluminum, single-section with rubber feet. The ladder shall meet or exceed the latest NFPA standards.

LADDER, 14' ROOF

There shall be one (1) Duo-Safety or equivalent model 775-A, 14' roof ladder supplied with the apparatus. The ladder shall be aluminum, single-section with folding steel roof hooks on one end and steel spikes at the other. The ladder shall meet or exceed the latest NFPA standards.

LADDER, 24' 2-SECTION EXTENSION

There shall be one (1) Duo-Safety or equivalent model 900-A, 24' two-section ladder supplied with the apparatus. The extension ladder shall be aluminum with steel spurs on one end. The ladder shall meet or exceed the latest NFPA standards.

30 DEGREE ELBOW - 3" FNST X 5" STORZ

There shall be one (1) Kochek or equivalent model SKE53R, 3" FNST rocker lug x 5" Storz, adapter supplied with the apparatus. The elbow shall have a 30-degree turn down.

CAP, 5" STORZ

There shall be one (1) Kochek or equivalent model CC507, 5" Storz cap with chain provided with the apparatus.

WHEEL CHOCKS WITH BRACKETS

There shall be one (1) pair of Ziamatic model SAC-44 folding wheel chocks with SQCH-44-H horizontal chock holder mounted on the apparatus body as directed by the fire department.

TRADE IN

Proposal price shall include trade in of 2001 E-One pumper known as “Engine 8.” Specifications can be obtained at the Somerset Fire Department.