KENTVILLE VOLUNTEER FIRE DEPARTMENT
463 Main St., Kentville, N.S. B4N 1K9
Station: (902) 678-7798 Fax: (902) 679-0790
Email: secretary@kentvillefire.ca

Invitation to Tender
for the Provision of
Top Mount Enclosed Rescue Engine

Tender # KVFDRE-2020

INFORMATION TO TENDERERS

Specifications are available electronically from Debbie: secretary@kentvillefire.ca. Please specify **Tender - Fire Rescue Engine** in the subject line.

Potential suppliers are encouraged to carefully analyze each specification, as these reflect the design and quality the truck and will be an important factor in choosing the successful supplier.

Contact Persons: Scott Hamilton
Fire Chief (Acting)
kvfd_Chief@kentvillefire.ca
902-680-6066

Tender Submission:

1) Tenderers are invited to register for automatic updates by sending an email request; include the Tender # in the subject line to secretary@kentvillefire.ca .

2) Submit completer Tender documents in a sealed envelope, clearly marked as:

   Request for Proposal Custom Heavy-Duty Rescue Pumper
   Tender #KVFDRE – 2020

   Closing at 1:00PM local time, Thursday, October 24, 2020

   TO: Kentville Volunteer Fire Department
   463 main St
   Kentville, NS B4N 1K9

3) Electronic(email) submissions will only be accepted if the following criteria are met:

   a. The entire bid document is presented and issued in Adobe PDF format;
   b. The PDF documents are emailed to Debbie MacMillan (secretary@kentvillefire.ca) by **no later** than 1:00pm Atlantic Daylight Time, of the dated closing date.

INTENT OF SPECIFICATIONS

It is the intent of these specifications to cover the furnishing and delivery to the **Kentville Fire Department** of a complete custom fire apparatus equipped as hereinafter specified.

It is the intent of the **Kentville Fire Department** to acquire a custom heavy-duty top mount enclosed extruded aluminum rescue pumper with a proven safety record. Apparatus with enhanced safety and performance characteristics and a proven history of safe operation will be given preference.

It is the intent of the **Kentville Fire Department** to closely match the design and construction of existing fire apparatus.

With the view of obtaining the best results and the most acceptable apparatus for service in the fire department these specifications cover only the general requirements as to the type of construction and tests to which the apparatus must conform, together with certain details to furnish equipment and appliances with which the successful bidder must conform. Minor details of construction and materials, where not otherwise specified, are left to the discretion of the contractor who shall be solely responsible for the design and construction of all features.

The NATIONAL FIRE PROTECTION ASSOCIATION pamphlet #1901 2016 edition for Motor Vehicle Apparatus, unless otherwise specified in these specifications shall prevail. In addition, the apparatus shall be tested and labelled to ULC-S515-13. The ULC test must be by ULC and not a third party.

ONLY THE SPECIFIED FIREFIGHTING SUPPORT EQUIPMENT LISTED IN THESE SPECIFICATIONS SHALL BE PROVIDED.

The apparatus shall conform to all Federal and Provincial motor vehicle safety standards.

Bids will only be considered from companies that have an established reputation in the field of firefighting and rescue apparatus manufacturing. To be considered as established, companies providing proposals shall have been in business for at least ten (10) years and shall have manufactured this design of custom fire apparatus for a minimum of ten (10) years. If the proposal is presented by a dealer, the manufacturing company shall have been in business for at least ten (10) years.

Each bid must be accompanied by a set of detailed manufacturer's specifications consisting of a detailed description of the apparatus and equipment proposed. These specifications shall include size, location, type, and model of all component parts being furnished. Detailed information shall be provided on the materials used to construct all facets of the apparatus body. Any bidder who fails to submit detailed construction specifications shall be considered non-responsive and shall render their proposal ineligible for award.

Each bidder shall furnish satisfactory evidence of the ability to construct the apparatus specified and shall state the location of the factory where the chassis and apparatus will be built. They shall also show that they are able to render prompt service and to furnish replacement parts for the completed apparatus chassis, body and components.

Bidders shall have authorized service facilities or personnel within a reasonable distance of **Kentville, Nova Scotia.** Each bidder's proposal shall include a full description of their service facilities.

The capabilities of the dealer to provide prompt service and parts replacement will be a critical factor in the selection of the successful bidder. The bidder shall also clearly indicate how they propose to deliver prompt on-site service for critical issues.

The manufacturer shall specify in his bid the number of working days and/or calendar days after acceptance of the formal contract by the manufacturer that the completed apparatus will be delivered by the purchaser.

Bidders who can provide quicker delivery and who are compliant with these specifications will be given preference. A delivery of approximately 400 days is desired.

The manufacturer will not be held liable for changes arising from its failure to make or delay in making deliveries because of fire, flood, riot, major component shortage, accidents, acts of God, or any circumstances beyond their control.

QUALITY AND WORKMANSHIP

The workmanship must be of the highest quality in its respective field. Special consideration will be given to the following points:

1. **Safety**. The apparatus must be designed with firefighter safety in mind. In particular, cab construction and crash test results will be an important factor in the selection of the successful bidder.
2. **Performance**. The apparatus must be designed, engineered and constructed with performance in mind. This shall include warranties and other provisions that will extend the longevity of the apparatus.
3. **Accessibility**. Ease for accessing various components which require periodic maintenance or monitoring.

Construction must be rugged, and design must be certified to carry the loads as specified and to meet the road and speed requirements as set forth under "PERFORMANCE TESTS AND REQUIREMENTS" of NFPA Pamphlet #1901 2016 edition.

Welding shall not be employed in the assembly of the apparatus in a manner that will prevent the removal of major components for service and/or repair.

SINGLE SOURCE MANUFACTURER

Preference will be given to single source apparatus manufacturers. This is to ensure that there are no split-warranty issues and that the chassis and chassis systems have been designed and engineered to be totally integrated.

The definition of single source is a manufacturer that designs and manufactures their products using an integrated approach, including the chassis, cab weldment, cab, pump-house (including the sheet metal enclosure, valve controls, piping and operator’s panel) and body being designed, fabricated and assembled on the bidder's premises.

The bidder shall state the location of the factory where the apparatus is to be built.

ONLINE BUILD PROGRESS PROGRAM

Bids will only be accepted from manufacturers who provide an online build progress service. Digital images shall be provided through an online system that illustrates the build process through every stage.

PRE-BUILD MEETING AND FINAL INSPECTION TRIP

A pre-build meeting and a final inspection at the manufacturing facility for two (2) fire department members shall be provided.

The costs for the pre-build and final inspection meetings shall be the responsibility of the bidder.

NOTE: As most firefighting and rescue apparatus sold in Canada is totally or partially manufactured in the US and given the present Covid-19 pandemic situation the pre-build and potentially the final inspection may need to be conducted in Canada. The prebuild meeting would be at the fire department and the final inspection would be at the dealer service and warranty location. The fire department will not risk the health and safety of any of its members.

ISO CERTIFICATION

The manufacturer shall also be certified to operate a Quality Management System under the requirements of ISO 9001. These standards sponsored by the International organization for Standardization (ISO) specify the quality systems that shall be established by the manufacturer for design, manufacture, installation and service. A copy of the certificate of compliance shall be included with the bid.

DESIGN

The successful bidder shall be solely responsible for the design, construction and material used in the construction of the vehicle. The apparatus shall be of the latest design and type while using the most current industry construction techniques.

Each bidder shall supply with their bid a detailed drawing consisting of the driver side, passenger side rear views *and top view* of the apparatus. This drawing shall be representative of the apparatus being bid. The drawing must include but not be limited to all principle dimensions (height/width/length). Pictures or brochures are also encouraged that represent the quality of construction being proposed.

The apparatus, assemblies, component parts, etc., shall be designed and constructed with consideration to the nature and distribution of the load to be sustained and to the general character of the service to which the apparatus is to be subjected.

The apparatus shall be designed and constructed so component parts can be removed for service and repair with standard tools. Any special tools needed to service any component of the apparatus built or supplied by the component manufacturer shall be supplied with the apparatus. During the design and construction process the apparatus manufacturer shall take into consideration the ease of access to various areas requiring lubrication, inspection, service or adjustment.

The design, and materials must be of the highest quality in its respective field. Quality control inspections shall be performed at each step of the manufacturing process.

EXCEPTIONS TO SPECIFICATIONS

Each bidder response shall include a returned copy of these specifications indicating compliance or non-compliance with **EACH** area of the specifications.

All exceptions, no matter how minor must be indicated.

Exceptions shall be listed on a separate sheet and shall refer to specification page number and paragraph. It will be mandatory for any perspective bidder that deviates from the proposed specifications, to give a full description of all deviations.

Items not addressed will be considered as being bid with no exception and will be included on the apparatus in the form presented in our specifications. Non-compliance will be grounds for rejection of the completed vehicle - **NO EXCEPTION.**

Bidders must follow this process.

Where bidder's specifications and/or construction differ in any way from the bid specification, a full and complete description in the specification will be required. Drawings will also be required to show alternative construction methods. Partial descriptions or general clarifications covering groups or sections of the specifications will be unacceptable.

CLARIFICATIONS TO SPECIFICATIONS

Clarifications shall refer to specification page number and heading. Any such clarification that appears vague or misleading shall be considered an exception. Complete clarifications are required describing the reason for the deviation. Apparatus will be inspected upon delivery for compliance with specifications. Deviations from what was bid and what is constructed may be cause for rejection of the apparatus.

CONTRACT AWARD

The purchaser reserves the right to reject any or all bid proposals and purchase the equipment it deems most suitable to its needs. Since all components and materials are commercially available these specifications shall in no way be considered proprietary.

The performance and construction requirements reflect a level of safety and durability desired by the **Kentville Fire Department**.

These performance and construction requirements shall be considered as minimum. Failure to meet the chassis, body minimum performance and design requirements may be cause for rejection of the proposal.

Payment will be upon delivery after acceptance by the fire department. Pricing shall not include any chassis pre-payments.

The intent of these specifications is to obtain the best value and design for the **Kentville Fire Department**. Pricing is an important component; however, the lowest price may not necessarily be accepted.

All bid pricing shall remain valid for 30 days after opening.

PAYMENT TERMS

The Purchaser agrees to purchase and pay for the apparatus and miscellaneous equipment pursuant to the following terms and conditions:

1. All prices shall be less any taxes.
2. Payment of the apparatus will be upon delivery and acceptance by the fire department. Final inspection will be completed at the manufacturer's facility. Acceptance will be when the apparatus is delivered to the fire department. There will be no prepayment for the chassis.
3. The apparatus, without exception, will not be placed in service prior to full payment of apparatus

SUBMISSION OF BIDS

Bids shall be submitted in accordance with the following instructions:

- The bidder's proposed specifications shall be provided in full. Any deviations and clarifications shall be clearly marked.
- The bidder's proposed specifications detailing their construction methods shall be provided. This is necessary to evaluate each bidder's actual intent of building the equipment as specified herein.
- The bidder's proposed format shall be the same as these specifications to allow the customer to easily compare the bids. **NO EXCEPTIONS**.
- Bids shall be returned in a sealed envelope clearly marked "Request for Proposal Custom Heavy-Duty Rescue Pumper ".
- The purchaser reserves the right to accept or reject any or all bids, to waive irregularities and to make the award in any manner deemed to be in their best interest.
- Bidders shall indicate YES or NO for each item on the following detailed specifications. The answer YES indicates 100% compliance with the requirements of the specifications. Any bid response that is misleading will be disqualified. If the bid is accepted and significant deviations are discovered at the prebuild meeting the bidder will be immediately disqualified. All costs incurred by the fire department up to this point shall be the responsibility of the bidder. A bid submission indicates agreement with this requirement.

FIRE DEPARTMENT ABILITY TO NEGOTIATE

In the event the proposal exceeds the fire department budget, the fire department reserves the right to select a successful bidder and then negotiate with this bidder to change options so that the apparatus fits within the fire department budget.

REQUIREMENT	YES	NO
TESTING COMPLIANCE STANDARD **Hose Bed Capacity** The hose bed shall have the capacity to store the following hose from the driver side to the officer side. Desired hosebed capacity: • Lay 1 - 800 ft. of 2.50 DJ • Lay 2 - 1000 ft. of 5.00 LDH • Estimated Weight - 1556 lbs. **Overall Height Restriction** The apparatus overall height shall not exceed 10’ 8” +/- 2”. **Overall Length Restriction** The overall length shall not exceed 34’ 1”. **Bi-Lingual Tags** Safety, warning & caution tags supplied by the apparatus manufacturer on the cab, chassis, body and pump module are to be in both English and French languages to comply with Canadian requirements. **ULC Compliance Testing** The apparatus shall be tested and labeled for CAN/ULC S515-13 compliance. Testing shall include the water pump, road test, ULC checklist and generator (if equipped). **Equipment Capacity** Equipment allowance on the apparatus shall be 2500 lbs. This allowance is in addition to the weight of the hoses and ground ladders listed in the shop order as applicable. **BUMPERS** **Bumper** The vehicle shall be equipped with a one piece 12” high bumper, made from 10-gauge polished stainless steel. The bumper shall have two (2) stiffening ribs and		

REQUIREMENT	YES	NO
two (2) rubber impact strips. The bumper ends shall be tapered 15 degrees to provide bumper swing clearance. **Front Bumper Extension** The bumper shall be extended approximately 20” from the face of the cab as required. **Bumper Gravel Shield** The extended front bumper gravel shield shall be made of 3/16” (.375”) aluminum tread plate material. **BUMPER TRAYS** **Bumper Tray - Center** A hose tray constructed of 1/8” aluminum shall be recessed into the front bumper extension. The tray shall be located in the center of the bumper and be approximately 14" deep (13" to the top of the slats). One-inch thick aluminum slats shall be included in the bottom of the hose tray to aid in the dissipation of water from the tray. **Lid, Bumper Hose Tray** The center bumper tray shall have a diamond plate lid. The lid shall be hinged and include a D-Ring latch, rubber seal and gas shock hold open device. **FRAME ASSEMBLY** **Rear Underbody Support Frame** The body shall be supported at the rear by a steel frame extension bolted to the chassis frame rails. The frame rails and frame extension shall be isolated from the aluminum body extrusions by 5/16” x 2” fiber reinforced rubber. The frame extension shall be built with (2) 2.5” sq. x .25 wall thickness x full width cross rails welded to (2) 2.5” sq. x .25 wall thickness side rails. The frame extension assembly will be welded to steel weldments, which are secured to the chassis frame with 5/8” grade 8 bolts. The frame extension shall have a hot-dipped galvanized zinc coating for increased corrosion resistance. The coating shall be done in compliance with the ASTM A123 Standard. The frame extension shall not interfere with N.F.P.A. minimum requirements for angle of departure.		

REQUIREMENT	YES	NO
Frame Assembly The frame shall consist of two (2) C-channel frame rails with heavy-duty crossmembers. Each frame rail shall have the following minimum specifications in order to minimize frame deflection under load and thereby improve vehicle ride and extend the life of the frame: • Dimensions: 12” x 3-1/2” x 3/8” • Material: 110,000-psi minimum yield strength, high strength, low alloy steel • Section Modulus: 20.90 cu. in. • Resisting Bending Moment (RBM): 2,299,000 in. lbs. There shall be a minimum of six (6) crossmembers joining the two (2) frame rails in order to make the frame rigid and hold the rails/liners in alignment. The crossmembers shall be a combination of a formed steel C-channel design along with heavy duty steel fabricated designs as required for the exact chassis configuration. The crossmembers shall be attached to the frame rails with not less than four (4) bolts at each end arranged in a bolt pattern to adequately distribute the crossmember load into the rail/liner and minimize stress concentrations. All frame fasteners shall be high-strength, Grade 8, flanged-head threaded bolts and nuts for frame strength, durability, and ease of repair. The nuts shall be Stover locknuts to help prevent loosening. The frame fasteners shall be tightened to the proper torque at the time of assembly. The frame rails shall be hot-dip galvanized and powder coated for improved corrosion resistance. The galvanization shall be a minimum of 4 mils thick and done in accordance with ASTM A123. The powder coat shall be 6.5 mils thick (+/- 1.5 mils) and pass ASTM D3359 testing. The frame crossmembers and frame-mounted components (suspensions, axles, air tanks, battery boxes, fuel tank, etc.) shall be painted black. The apparatus manufacturer shall supply a full lifetime frame warranty including crossmembers against defects in materials or workmanship. Warranties that provide a lifetime warranty for only the frame rails, but not the crossmembers, are not acceptable. NO EXCEPTIONS. The custom chassis frame shall have a WHEEL ALIGNMENT in order to achieve maximum vehicle road performance and to promote long tire life. The alignment shall conform to the manufacturer`s internal specifications. All wheel lug nuts and axle U-bolt retainer nuts shall be tightened to the proper torque at the time of alignment. The wheel alignment documentation shall be made available at delivery upon request.		

REQUIREMENT	YES	NO
Galvanized Frame Components The front chassis frame extensions, rear subframe, crossmembers and battery brackets shall be hot-dip galvanized for increased corrosion resistance. The coating shall be done in compliance with the ASTM A123 Standard. **Coated Fasteners** The custom chassis frame assembly shall be assembled using GEOMET 720 coated fasteners for corrosion resistance. **AXLE OPTIONS** **Front Axle** The vehicle shall utilize an Meritor FL-941 front axle with a rated capacity of 20,000 lbs. It shall have ”easy steer” knuckle pin bushings and 68.5” kingpin centers. The axle shall be of I-beam construction and utilize grease-lubricated wheel bearings. The vehicle shall have a nominal cramp angle of 45 degrees, plus two (+ 2) degrees to minus three (- 3) degrees including front suction applications. The front axle hubs shall be made from ductile iron and shall be designed for use with 10-hole hub-piloted wheels in order to improve wheel centering and extend tire life. Front springs shall be parabolic tapered, minimum 4” wide x 54” long (flat), minimum 3 leaf, progressive rate with a capacity of 20,000 lbs at the ground. The springs shall have Berlin style eyes and rubber bushings on each end with an additional standard wrap at the front eye. Tapered leaf springs provide a 20% ride improvement over standard straight spring systems. The vehicle shall be equipped with a Sheppard model M-110 power steering gear, used in conjunction with a power assist cylinder. The steering assembly shall be rated to statically steer up to a maximum front axle load of 20,000 lbs. Relief stops shall be provided to reduce system pressure upon full wheel cut. The system shall operate mechanically should the hydraulic system fail. In order to achieve maximum vehicle road performance and to promote long tire life, there shall be a wheel alignment. The alignment shall conform to the manufacturer`s internal specifications. All wheel lug nuts and axle U-bolt retainer nuts shall be tightened to the proper torque at the time of alignment. The wheel alignment documentation shall be made available at delivery.		

REQUIREMENT	YES	NO
Shock Absorbers Front Koni model 90 shock absorbers shall be provided for the front axle. The shocks shall be three way adjustable. The shocks shall be covered by the manufacturer`s standard warranty.  **Rear Axle**  The vehicle shall utilize an Meritor RS-30-185, 31,000 lb. single rear axle with single reduction hypoid gearing and a manufacturer`s rated capacity of 31,000 lbs. The axle shall be equipped with oil-lubricated wheel bearings with Meritor oil seals. The rear axle hubs shall be made from ductile iron and shall be designed for use with 10-hole hub-piloted wheels to improve wheel centering and extend tire use. *NOTE: The fire department is open to lesser axle ratings if recommended by the manufacturer. The fire department would like a top speed of 65-68 MPH and realizes that NFPA recommends a top speed of not more than 60 MPH with a GVWR in excess of 50,000 pounds.* **Driver Controlled Differential** A Rockwell driver controlled main differential lock shall be supplied. Operated from within the cab, it reduces wheel spin-outs by transferring power from the slipping wheel to the wheel with traction. An indicator shall be provided visible to the driver to show when the lock is engaged. **SUSPENSIONS** **Rear Suspension** The vehicle shall be equipped with a FIREMAAX® EX model FMX-312 air ride suspension. The suspension shall include dual height control valves that allow uneven, side heavy loads to be balanced, Quik-Align for easy axle alignment and two (2) hydraulic shock absorbers. The suspension shall be rated for the maximum axle capacity. **WHEEL OPTIONS** **Front Wheels** The vehicle shall have two (2) polished (on outer wheel surfaces only) Alcoa aluminum disc wheels. They shall be forged from one-piece corrosion-resistant aluminum alloy and sized appropriately for the tires.		

REQUIREMENT	YES	NO
Front Wheel Trim Package The front wheels shall have stainless steel lug nut covers (for use with aluminum wheels) or chrome plated plastic (for use with steel wheels). The front axle shall be covered with American made Real Wheels brand mirror finish, 304L grade, non-corrosive stainless-steel universal baby moons. All stainless-steel baby moons shall carry a lifetime warranty plus a 2-year re-buffing policy. There shall be two (2) baby moons and twenty (20) lug nut covers. **Rear Wheels** The vehicle shall have four (4) polished (on outer wheel surfaces only) Alcoa aluminum disc wheels. They shall be forged from one-piece corrosion-resistant aluminum alloy and sized appropriately for the tires. **Rear Wheel Trim Package, Single Axle** The rear wheels shall have stainless steel lug nut covers (chrome plated steel lug nut covers not acceptable), or American made chrome plated plastic lug nut covers. The rear axle shall be covered with American made Real Wheels brand mirror finish, 304L grade, non-corrosive stainless steel, spring clip band mount high hats, DOT user friendly. All stainless-steel high hats shall carry a lifetime warranty plus a 2 year re-buffing policy. There shall be two (2) high hats and twenty (20) lug nut covers. **Aluminum Wheel Finish [Qty: 6]** A Dura-Brite high performance sealant shall be supplied on the aluminum wheel. The sealant shall not yellow under UV light exposure and shall impede staining and corrosion of the aluminum wheel. **Valve Stem Extensions** Each inside rear wheel on the rear axle shall have valve extensions. **TIRE OPTIONS** **Front Tires** The front tires shall be two (2) Michelin 425/65R 22.5 tubeless type 20 PR radial tires with XZY3 Wide Base aggressive tread.		

REQUIREMENT	YES	NO
The tires with wheels shall have the following weight capacity and speed rating: • Max front rating 22,800 @ 65 mph. • Max front rating with Alco aluminum wheels - 24,400 @ 65 MPH (intermittent fire service rating if GAW is over 22,800) The wheels and tires shall conform to the Tire and Rim Association requirements. **Rear Tires** The rear tires shall be Michelin 315/80R22.5 tubeless type radial tires with XDN2 GRIP all weather tread. The tires with wheels shall have the following weight capacity: • 33,080 lbs. (dual) @ 75 MPH. (Intermittent fire service max load 35,396 lbs) The wheels and tires shall conform to the Tire and Rim Association requirements. **Tire Pressure Indicators** The apparatus shall be provided with Real Wheels AirGuard LED tire pressure indicating valve stem caps. When the tire is under inflated by 5-10 PSI, the LED indicator on the cap shall flash red. The indicator housings shall be shock resistant and constructed from polished stainless steel. The indicators shall be calibrated by attaching to valve stem of a tire at proper air pressure per load ratings and easily re-calibrated by simply removing and re-installing them during service. **BRAKE SYSTEMS** **Front Brakes** The front axle shall be equipped with Meritor DiscPlus EX225H 17-inch disc brakes. The brakes shall be covered by the manufacturer`s standard warranty which is two years, unlimited mileage and parts only. **Rear Brakes** The rear axle shall be equipped with ArvinMeritor 16-1/2” x 7” S-cam brakes with cast brake drums. Q-Plus shoes shall be provided with up to 24,000 lb. axle ratings and P-Type shoes with over 24,000 lb. axle ratings.		

REQUIREMENT	YES	NO
The rear axle brakes shall be furnished with automatic slack adjusters. ArvinMeritor brand shall be supplied on RS-24-160 and RS-25-160 axles, and Haldex brand shall be supplied on RS-26-185 and RS-30-185 axles. A 3 year/unlimited miles parts and 3 year labor rear brake warranty shall be provided as standard by ArvinMeritor Automotive. The warranty shall include bushings, seals, and cams. **Brake System** The vehicle shall be equipped with air-operated brakes and an anti-lock braking system (ABS). The brake system shall meet or exceed the design and performance requirements of the current Federal Motor Vehicle Safety Standard (FMVSS)-121, and the test requirements of the current NFPA 1901 Standard. A dual-treadle brake valve shall correctly proportion the braking power between the front and rear systems. The air system shall be provided with a rapid pressure build-up feature, designed to meet current NFPA 1901 requirements, to allow the vehicle to begin its emergency response as quickly as possible. A pressure-protection valve shall be installed to prevent use of the air horns or other air-operated devices should the air system pressure drop below 85 psi. This feature is designed to prevent inadvertent actuation of the emergency/parking brakes while the vehicle is in motion. Two (2) air pressure needle gauges, one (1) each for front and rear air pressure, with a warning light and buzzer shall be installed at the driver`s instrument panel. The braking system shall be provided with a minimum of three (3) air tank reservoirs for a total air system capacity of 5,214 cu. in. One (1) reservoir shall serve as the wet tank and a minimum of one (1) tank shall be supplied for each of the front and rear axles. The total system shall carry a sufficient volume of air to comply with FMVSS-121. Tank Capacities in Cubic Inches: Wet Front Rear Total 1,738 1,738 1,738 5,214 Spring-actuated emergency/parking brakes shall be installed on the rear axle. A Bendix-Westinghouse SR-1 valve, in conjunction with a double check valve system, shall provide automatic emergency brake application when the air brake		

REQUIREMENT	YES	NO
system pressure falls below 40 psi in order to safely bring the vehicle to a stop in case of an accidental loss of braking system air pressure. A four-channel Wabco ABS shall be provided to improve vehicle stability and control by reducing wheel lock-up during braking. This braking system shall be fitted to both front and rear axles. All electrical connections shall be environmentally-sealed for protection against water, weather, and vibration. The system shall constantly monitor wheel behavior during braking. Sensors on each wheel transmit wheel speed data to an electronic processor, which shall detect approaching wheel lock-up and instantly modulate (or pump) the brake pressure up to five (5) times per second to prevent wheel lock-up. Each wheel shall be individually controlled. To improve field performance, the system shall be equipped with a dual-circuit design configured in a diagonal pattern. Should a malfunction occur in one circuit, that circuit shall revert to normal braking action. A warning light at the driver`s instrument panel shall signal a malfunction. The system shall also be configured to work in conjunction with all auxiliary engine, exhaust, or driveline brakes to prevent wheel lock-up. To improve maintenance troubleshooting, provisions in the system for an optional diagnostic tester shall be provided. The system shall test itself each time the vehicle is started, and a dash-mounted light shall go out once the vehicle is moving above 4 MPH. A 3 year/300,000 mile parts and labor Anti-Locking Braking System (ABS) warranty shall be provided as standard by Meritor Automotive. **Park Brake Release** One (1) Bendix-Westinghouse PP-5 parking brake control valve shall be supplied on the lower dash panel within easy reach of the driver. **Electronic Stability Control** The apparatus shall be equipped with a G4 4S4M Electronic Stability Control (ESC) system that combines the functions of Roll Stability Control (RSC) with the added capability of yaw - or rotational – sensing. RSC focuses on the vehicle’s center of gravity and the lateral acceleration limit or rollover threshold. When critical lateral acceleration thresholds are exceeded, RSC intervenes to regulate the vehicle’s deceleration functions. The added feature of ESC is to automatically intervene to reduce the risk of the vehicle rotating while in a curve or taking evasive action, prevents drift out through		

REQUIREMENT	YES	NO
selective braking, and controlling and reducing vehicle speed when lateral acceleration limits are about to be exceeded. Intervention by the system occurs in three forms - engine, retarder and brake control. The ESC system uses several sensors to monitor the vehicle. These include a steering wheel angle sensor, lateral accelerometer, and yaw position sensor. ESC constantly monitors driving conditions and intervenes if critical lateral acceleration is detected or if the vehicle begins to spin due to low friction surfaces. The system provides control of engine and retarder torque as well as automatically controlling individual wheels to counteract both over steer and under steer. To further improve vehicle drive characteristics, the unit shall be fitted with Automatic Traction Control (ATC). This system shall control drive wheel slip during acceleration from a resting point. An extra solenoid valve shall be added to the ABS system. The system shall control the engine and brakes to improve acceleration slip resistance. The system shall have a dash mounted light that shall come on when ATC is controlling drive wheel slip. 3 year/300,000 miles parts and labor warranties for ESC, RSC, and ATC shall be provided as standard by Meritor Automotive. **Dust Brake Shields** The rear axles shall have dust shields provided for the CAM brakes. **AIR SYSTEM OPTIONS** **Air Dryer** The chassis air system shall be equipped with a Bendix-Westinghouse AD-9 air dryer to remove moisture from the air in order to help prevent the air lines from freezing in cold weather and prolong the life of the braking system components. **Air Inlet Auto-Eject** A Kussmaul Air Auto-Eject #091-28 airline disconnect shall be installed for the air inlet connection. The airline will automatically disconnect when the vehicle is started. A Red weatherproof gasketed cover, which automatically closes when the airline is ejected, shall be supplied. The Auto-Eject shall be located outside driver's door next to handrail.		

REQUIREMENT	YES	NO
Isolated Air Reservoir The air system shall have an additional 1738 cu. in. isolated reservoir. The supply side of the reservoir shall be equipped with a check valve and an 85-psi pressure protection valve. Specified options shall be plumbed to the isolated air tank. **Auxiliary Air Tank Plumbing** The auxiliary air tank to be plumbed to the chassis air horns only. **Heated Moisture Ejectors** All air reservoirs shall be equipped with a Bendix DV-2 automatic reservoir drain valve which shall automatically eject moisture and contaminants from the reservoirs. The moisture ejectors shall be heated. **Air Lines** Air brake lines shall be constructed of color-coded nylon tubing routed in a manner to protect them from damage. Brass fittings shall be provided. **Air Horns** Dual Grover stuttertone air horns shall be provided, connected to the chassis air system. The horns shall be mounted through the front bumper. The front bumper shall have two (2) holes punched to accommodate the horns. A pressure protection valve shall be installed to prevent the air brake system from being depleted of air pressure. **ENGINES & TRANSMISSIONS** **Transmission Selector** A push-button transmission shift module, Allison model 29538373, shall be located to the right side of the steering column within easy reach of the driver. The shift position indicator shall be indirectly lit for after dark operation. The shift module shall have a “Do Not Shift” light and a “Service” indicator light. The shift module shall have means to enter a diagnostic mode and display diagnostic data including oil life monitor, filter life monitor, transmission health monitor and fluid level. A transmission temperature gauge with warning light and buzzer shall be installed on the cab instrument panel.		

REQUIREMENT	YES	NO
Transmission Fluid The transmission fluid shall be TranSynd, Shell Spirax S6ATF A295, or equivalent synthetic. **Vehicle Speed** Electronic speed limiting set at 60 MPH as required by NFPA 1901. *NOTE: The fire department would like a top speed of 65-68 MPH. The fire department realizes that NFPA recommends a top speed of not more than 60 MPH with a GVWR in excess of 50,000 pounds.* **Engine/Transmission Package** **Engine** The vehicle shall utilize a Cummins L9 engine as described below: • 450 maximum horsepower at 2200 rpm • 1250 lb-ft peak torque at 1200 rpm • Six (6) cylinder, charge air cooled, 4-cycle diesel • 543 cu. in. (8.9 liter) displacement - 4.49 in bore x 5.69 in stroke • 16.6:1 compression ratio • Viable Geometry Turbocharged • Engine shall be equipped with Full-Authority Electronics • Electronic Timing Control fuel system • Fuel cooler (when equipped with a fire pump) • Cummins supplied fuel filter with integral water separator and water-in-fuel sensor approved by Cummins for use on the L9 engine • Fleetguard LF9009 Venturi Combo combination full-flow/by-pass oil filter approved by Cummins for use on the ISL engine • Engine lubrication system, including filter, shall have a minimum capacity of 25 quarts • Delco-Remy 39 MT-HD 12-volt starter • Cummins 18.7 cubic foot per minute (cfm) air compressor • Corrosion inhibitor additive for coolant system • After treatment system consisting of a oxidation catalyst and diesel particulate filter and selective catalyst reduction system • Ember separator compliant with current NFPA 1901 standard • The engine shall be compliant with 2021 EPA Emission standards The engine air intake shall draw air through the front cab grill. The intake opening shall be located on the officer (right) side behind front cab face with a plenum that directs air to the air filter. The air cleaner intake piping shall be made from aluminized steel tubing with flexible rubber hoses. The intake piping clamps shall		

REQUIREMENT	YES	NO
be heavy-duty, constant-torque, T-bolt style to ensure proper sealing under all temperatures in order to keep dust and other contaminants out of the engine intake air stream and protect the engine. The air cleaner shall be an 11” diameter K&N for lower restriction and high air flow. The filtration media shall be washable and easily accessed for service. The air filter shall have a 3 year / 300,000 mile warranty. The engine exhaust piping shall be a minimum of 4” diameter welded stainless steel tubing. The aftertreatment system shall be mounted horizontally under the right-hand frame rail in back of the cab in order to minimize heat transmission to the cab and its occupants. The exhaust shall be directed away from the vehicle on the right side ahead of the rear wheels in order to keep exhaust fumes as far away as possible from the cab and pump operator position. A 5-year/100,000-miles parts and labor warranty shall be provided as standard by Cummins. A copy of the Engine Installation Review stating the engine installation meets Cummins recommendations shall be provided as requested. The engine installation shall not require the operation of any type of ”power-down” feature to meet engine installation tests. **Transmission** The vehicle shall utilize an Allison EVS3000P, electronic, 5-speed automatic transmission. A push button shift module shall be located right side of the steering column, within easy reach of the driver. The shift position indicator shall be indirectly lit for after-dark operation. The shift module shall have a ”Do Not Shift” light and a ”Service” indicator light that are clearly visible to the driver. The shift module shall have means to enter a diagnostic mode and display diagnostic data. A transmission oil temperature gauge with warning light and buzzer shall be installed on the cab instrument panel to warn the driver of high oil temperatures that may damage the transmission. The transmission shall have a gross input torque rating of 1250 lb.-ft. and a gross input power rating of 450 HP. The gear ratios shall be as follows: 1 - 3.49 2 - 1.86 3 - 1.41		

REQUIREMENT	YES	NO
4 - 1.00 5 - .75 R - 5.03 The transmission shall have an oil capacity of 23 quarts and shall be equipped with a fluid level sensor (FLS) system, providing direct feedback of transmission oil level information to the driver. A water-to-oil transmission oil cooler shall be provided to ensure proper cooling of the transmission when the vehicle is stationary (no air flow). Air-to-oil transmission oil coolers, which require constant air flow, are not acceptable. The transmission shall be provided with two (2) engine-driven PTO openings located at the 4 o`clock and 8 o`clock positions for flexibility in installing pto-driven equipment. The automatic transmission shall be equipped with a power lock-up device. The transmission lock-up shall prevent down shifting of the transmission when the engine speed is decreased during pump operations, thereby maintaining a constant gear ratio for safe operation of the pump. The transmission lock-up shall be automatically activated when the pump is engaged in gear. The transmission lock-up shall be automatically deactivated when the pump is disengaged for normal road operation. A 5-year/unlimited miles parts and labor warranty shall be provided as standard by Allison Transmission. **Automatic Shift to Neutral** The transmission shall be programmed to comply with NFPA 1901 and automatically shift to neutral upon application of the parking brake. **SECONDARY BRAKING** **Jacobs Engine Brake** One (1) Jacobs engine brake shall be installed to assist in slowing and controlling the vehicle as required by NFPA 1901 for vehicles with gross vehicle weight ratings (GVWR) of 36,000 lbs. or greater. An on-off control switch and a high-medium-low selector switch shall be mounted in the cab accessible to the driver. When activated, the Jacobs engine brake shall cut off the flow of fuel to the cylinders and alter the timing of the exhaust valves. This shall transform the engine into a high-pressure air compressor, driven by the wheels, and the		

REQUIREMENT	YES	NO
horsepower absorbed by the engine in this mode shall slow the vehicle. The selector switch allows the driver to select the amount of retarding power. When the on-off switch is in the “on” position, the engine brake shall be automatically applied whenever the accelerator is in the idle position and the automatic transmission is in the lock-up mode. If the accelerator is depressed or if the on-off switch is placed in the “off” position, the engine brake shall immediately release and allow the engine to return to its normal function. **Transmission Programming** The transmission shall include the Allison 2nd gear Pre-Select feature. This option will direct the transmission to down shift to second gear when the throttle is released and the Jacobs engine brake (or Telma retarder wired to activate with release of throttle) is engaged. This feature is designed to increase brake life and aid vehicle braking. **EXHAUST OPTIONS** **Exhaust End Modification** The end of the exhaust tail pipe shall be modified to accommodate a Plymovent in-house exhaust extraction system. The tail pipe will be at 90 degrees and straight out below the side of body. A stop ring shall be provided on the tail pipe to properly position the Plymovent nozzle. The exhaust outlet shall be vented for use with 2013 and newer EPA engines. **COOLING PACKAGE** **Engine Cooling Package** **Radiator** The cooling system shall include an aluminum tube-and-fin radiator with a minimum of 1,408 total square inches of frontal area to ensure adequate cooling under all operating conditions. There shall be a drain valve in the bottom tank to allow the radiator to be serviced. A sight glass shall be included for quick fluid level assessment. The radiator shall be installed at the prescribed angle in order to achieve the maximum operational effectiveness. This shall be accomplished according to established work instructions and properly calibrated angle measurement equipment. **Silicone Hoses** All radiator and heater hoses shall be silicone. Pressure compensating band clamps shall be used to eliminate hose pinching on all hoses 3/4" diameter and		

REQUIREMENT	YES	NO
larger. All radiator hoses shall be routed, loomed, and secured so as to provide maximum protection from chafing, crushing, or contact with other moving parts. **Coolant** The cooling system shall be filled with a 50/50 mixture of water and antifreeze/coolant conditioner to provide freezing protection to minus 40 (- 40) degrees F for operation in severe winter temperatures. **Coolant Recovery** There shall be a coolant overflow recovery system provided. **Charge Air Cooler System** The system shall include a charge air cooler to ensure adequate cooling of the turbocharged air for proper engine operation and maximum performance. **Charge Air Cooler Hoses** Charge air cooler hoses shall be made from high-temperature, wire-reinforced silicone to withstand the extremely high temperatures and pressures of the turbocharged air. The hoses shall incorporate a flexible hump section to allow motion and misalignment of the engine relative to the charge air cooler. Charge air cooler hose clamps shall be heavy-duty, constant-torque, T-bolt clamps to ensure proper sealing under all temperatures in order to keep dust and other contaminants out of the engine intake air stream and protect the engine. **Fan/Shroud** The fan shall be 30” in diameter with eleven (11) blades for maximum airflow and dynamic balance. It shall be made of nylon for strength and corrosion resistance. The fan shall be installed with grade 8 hardware which has been treated with thread locker for additional security. A fan shroud attached to the radiator shall be provided to prevent recirculation of engine compartment air around the fan in order to maximize the cooling airflow through the radiator. The fan shroud shall be constructed of fiber-reinforced high temperature plastic. The shroud shall be specifically formed with curved surfaces which improves air flow and cooling. **Transmission Cooler** The cooling system shall include a liquid-to-liquid transmission cooler capable of cooling the heat generated from the transmission. When a transmission retarder is selected, the cooler shall have an increased capacity to handle the additional heat load.		

REQUIREMENT	YES	NO
Engine Cooler A water to water type heat exchanger shall be provided to lower the chassis engine water temperature during prolonged pumping operations. The heat exchanger shall be installed in the engine coolant system in such a manner as to allow cool pump water to circulate around engine water, thus forming a true heat exchanger action. Cooler inlet and outlet shall be continuous, preventing intermixing of engine coolant and pump water. **FUEL SYSTEMS** **Fuel System** One (1) 50-gallon fuel tank shall be provided. The tank shall be of an all-welded, aluminized-steel construction with anti-surge baffles and shall conform to all applicable Federal Highway Administration (FHWA) 393.65 and 393.67 standards. The tank shall be mounted below the frame rails at the rear of the chassis for maximum protection. The tank shall be secured with two (2) wrap-around T-bolt type stainless steel straps. Each strap shall be fitted with protective rubber insulation and shall be secured with grade 8 hardware. This design allows for tank removal from below the chassis. The fuel tank shall be equipped with a 2” diameter filler neck. The filler neck shall extend to the rear of the vehicle behind the rear tires and away from the heat of the exhaust system as required by NFPA 1901 Standard for Automotive Fire Apparatus. The open end of the filler neck shall be equipped with a twist-off filler cap with a retaining chain. The tank shall be plumbed with top-draw and top-return fuel lines in order to protect the lines from road debris. Bottom-draw and/or bottom-return fuel lines are not acceptable. A vent shall be provided at the top of the tank. The vent shall be connected to the filler neck to prevent splash-back during fueling operations. A .50” NPT drain plug shall be provided at the bottom of the tank. The tank shall have a minimum useable capacity of 50 gallons of fuel with a sufficient additional volume to allow for thermal expansion of the fuel without overflowing the vent. A mechanical fuel pump shall be provided and sized by the engine manufacturer as part of the engine.		

REQUIREMENT	YES	NO
Fuel Shut-Off [Qty: 2] A shut-off valve shall be supplied to prevent drain back of fuel into the main supply line during filter changes. The valve(s) shall be located: one (1) each side of fuel/water separator. **Fuel Line** All fuel lines shall be rubber. **Fuel/Water Separator** A Racor fuel/water separator shall be installed in place of the Cummins fuel/water separator with drain. The unit shall utilize a three-step separate process: centrifuge for primary contaminant separation, conical baffles for water coalescing, and a replaceable filter for final particulate removal. The separator shall have a bottom drain for removing contaminants, shall be heated and shall have a rated maximum flow of 3.16 GPM. A sensor with indicator light and audible alarm shall be provided for the Racor fuel/water separator. The indicator light shall be mounted in the cab visible to the driver with the unit located inside the frame rails (as applicable). The unit will alert the driver of high water content in the separator bowl. **ALTERNATOR** **420 Amp Alternator** There shall be a 420-amp Leece Neville alternator installed as specified. The alternator shall be a Leece Neville brushless type with integral rectifier and adjustable voltage regulator with an output of 369 amps per NFPA 1901 rating (420 amps per SAE J56). **BATTERIES** **Battery System** The manufacturer shall supply four (4) heavy duty Group 31 12-volt maintenance-free batteries. Each battery shall be installed and positioned so as to allow easy replacement of any single battery. Each battery shall be equipped with carrying handles to facilitate ease of removal and replacement. There shall be two (2) steel frame mounted battery boxes, one (1) on the left frame rail and one (1) on the right frame rail. Each battery box shall be secured to the frame rail with Grade 8 hardware. Each battery box shall hold (2) batteries. The batteries shall have a minimum combined rating of 4,000 (4 x 1000) cold cranking amps (CCA) @ 0 degrees Fahrenheit and 820 (4 x 205) minutes of reserve capacity for extended operation. The batteries shall have 3/8-16 threaded stud terminals to ensure tight		

REQUIREMENT	YES	NO
cable connections. The battery stud terminals shall each be treated with concentrated industrial soft-seal after cable installation to promote corrosion prevention. The positive and negative battery stud terminals and the respective cables shall be clearly marked to ensure quick and mistake-proof identification. Batteries shall be placed on non-corrosive rubber matting and secured with hold-down brackets to prevent movement, vibration, and road shock. The hold-down bracket J-hooks shall be cut to fit and shall have all sharp edges removed. The batteries shall be placed in plastic trays to provide preliminary containment should there be leakage of hazardous battery fluids. There shall be two (2) plastic trays, each containing (2) batteries. Each battery tray shall be equipped with a rubber vent hose to facilitate drainage. The rubber vent hose shall be routed to drain beneath the battery box. The batteries shall be positioned in well-ventilated areas. One (1) positive and one (1) negative jumper stud shall be provided. Batteries shall have a warranty of twelve (12) months that shall commence upon the date of delivery of the apparatus. **Battery Splash Cover** The batteries shall be supplied with a ULC compliant cover system. Fabricated aluminum plates with a acid resistant coating shall be supplied and installed. **CHASSIS OPTIONS** **Engine Fan Clutch** The engine shall be equipped with a thermostatically controlled engine cooling fan. The fan shall be belt driven and utilize a clutch to engage when the engine reaches a specified temperature and / or the water pump is engaged (if equipped). When disengaged, the fan clutch shall allow for improved performance from optional floor heaters, reduced cab interior noise, increased acceleration and improved fuel economy. The fan shall be equipped with a fail-safe engagement so that if the clutch fails the fan shall engage to prevent engine overheating. **Drivelines** Drivelines shall have a heavy duty metal tube and shall be equipped with Spicer 1710HD universal joints to allow full-transmitted torque to the axle(s). Drive shafts shall be axially straight, concentric with axis and dynamically balanced.		

REQUIREMENT	YES	NO
Rear Tow Eyes Two (2) heavy duty tow eyes made of 3/4" (0.75") thick steel having 2-1/2" diameter holes shall be mounted below the body at the rear of the vehicle to allow towing (not lifting) of the apparatus without damage. The tow eyes will be welded to the lower end of a 5" steel channel that is bolted at the end of the chassis frame rails. The tow eyes shall be painted chassis black. **Front Tow Hooks** Two (2) heavy-duty stainless-steel front tow hooks shall be securely attached to the front chassis frame rails to allow towing (not lifting) of the apparatus without damage. They shall be mounted in the downward position. **On-Spot Tire Chains** The chassis shall be provided with On-Spot automatic tire chain system. The system shall include: • An air cylinder containing one diaphragm, one return spring, one pushrod and a collapsible dust boot held in place with an Oetiker® style retainer to prevent foreign material from entering the air cylinder. The cylinder will be assembled with a two-piece cylinder clamp. The air cylinder will be cast aluminum and the lid will be threaded to receive a 90-degree DOT approved air fitting. The cylinder and lid must be anodized for corrosion resistance. Each cylinder will have 6 strengthening ribs. The cylinder wall thickness will be a minimum of 6mm. • An extension rod and ball joint assembly that is fastened to the cylinder pushrod by means of a left hand thread. The ball joint must have a provision for greasing. • A swing arm that is connected to the ball joint assembly with a nylock lock nut on one side and is fastened to the cylinder bracket at the pivot point. The arm will be supported by 2 greaseable arm bushings. The arm will be one-piece hardened alloy material that is formed in such a fashion that it allows the chainwheel to contact the vehicle tire at 3-1/2 to 4 inches off the ground. • A chainwheel that is fastened to the arm with one 20mm bolt that is hardened to Metric Grade 8.8 along with a hardened lock nut. The bolt will also come with one chainwheel spacer for wheel height adjustment. The chainwheel will be 7-3/4 inches in diameter and will be constructed of a one-piece cast aluminum center hub that contains two maintenance-free sealed bearings. The circumference of the chainwheel will be rubber coated so that it may ride on the inside of the vehicle tire without causing any damage to the tire. There will be 6 lengths of chains approximately 13		

REQUIREMENT	YES	NO
inches long that will be welded to a single steel ring at 60-degree intervals. The steel ring will be bolted to the center hub with 6 Grade 8 cap screws and locknuts. Each length of chain will contain up to10 twisted links that are square-cut to provide for maximum traction in forward and reverse. Each chainwheel will be delivered with a chainwheel helmet to protect the chainwheel bearing and casting. A switch shall be provided in the cab for activation of the tire chains. **DEF Tank** A diesel exhaust fluid (DEF) tank with a five (5) gallon capacity shall be provided. The DEF tank shall include a heater fed by hot water directly from the engine block to prevent the DEF from becoming too cool to operate correctly per EPA requirements. The tank shall include a temperature sensor to control the heater control valve that controls the feed of hot water from the engine to the DEF tank heater. A sender shall be provided in the DEF tank connected to a level gauge on the cab dash. The tank shall be located left side below rear of cab. **Power Steering Cooler** A heat exchanger (cooler) shall be installed to maintain desired power steering fluid temperature. The cooler shall be a model DH-073-1-1 with air / oil design rated at 6300 BTU/HR @10 GPM. The cooler shall be mounted in front of the radiator and plumbed with #10 lines. **Heater Hose Insulation** Insulation shall be installed on heater hose lines to help retain heat in cold climates. The tubular insulation shall be 1.875" diameter .375 wall closed cell foam installed on the hoses in the chassis and below the cab. Includes pump compartment and body heater(s) if applicable. **CAB MODEL** **Cab Heavy Duty Medium Length** The vehicle shall be distinguished by an all-welded aluminum and fully enclosed tilt cab. The cab shall be designed exclusively for fire/rescue service and shall be pre-engineered to ensure long life. It shall incorporate an integral welded substructure of high-strength aluminum alloy extrusions that creates an occupant		

REQUIREMENT	YES	NO
compartment that is essentially a protective perimeter. The end result is a distinctive structure that is aesthetically appealing, functionally durable, and characterized by increased personnel safety. The cab shall be constructed from 3/16” (0.188”) 3003 H14 aluminum alloy plate roof, floor, and outer skins welded to a high-strength 6063-T6 aluminum alloy extruded subframe. Wall supports and roof bows are 6061 T6 aluminum alloy. This combination of a high-strength, welded aluminum inner structure surrounded on all sides by load-bearing, welded aluminum outer skins provides a cab that is strong, lightweight, corrosion-resistant, and durable. The inner structure shall be designed to create an interlocking internal ”roll-cage” effect by welding two (2) 3” x 3” x 0.188” wall-thickness 6063-T5 aluminum upright extrusions between the 3” x 3” x 0.375” wall-thickness 6061-T6 roof crossbeam and the 2.25” x 3” x 0.435” wall-thickness 6063-T6 subframe structure in the front. An additional two (2) aluminum upright extrusions within the back-of-cab structure shall be welded between the rear roof perimeter extrusion and the subframe structure in the rear to complete the interlocking framework. The four (4) upright extrusions -- two (2) in the front and two (2) in the rear -- shall be designed to effectively transmit roof loads downward into the subframe structure to help protect the occupant compartment from crushing in a serious accident. All joints shall be electrically seam welded internally using aluminum alloy welding wire. The subframe structure shall be constructed from high-strength 6061-T6 aluminum extrusions welded together to provide a structural base for the cab. It shall include a side-to-side 3” x 1.5” .375 thick C-channel extrusion across the front, with 3/4” x 2-3/4” (.75” x 2.75”) full-width crossmember tubes spaced at critical points between the front and rear of the cab. The cab floor shall be constructed from 3/16” (0.188”) 3003 H14 smooth aluminum plate welded to the subframe structure to give the cab additional strength and to help protect the occupants from penetration by road debris and under-ride collision impacts. The cab roof shall be constructed from 3/16” (0.188”) 3003 H14 aluminum treadplate supported by a grid of fore-aft and side-to-side aluminum extrusions to help protect the occupants from penetration by falling debris and downward-projecting objects. Molded fiberglass or other molded fiber-reinforced plastic roof materials are not acceptable. The cab roof perimeter shall be constructed from 4” x 6-5/8” (4” x 6.625”) 6063-T5 aluminum extrusions with integral drip rails. Cast aluminum corner joints shall be welded to the aluminum roof perimeter extrusions to ensure structural integrity. The roof perimeter shall be continuously welded to the cab roof plate to ensure a leak-free roof structure.		

REQUIREMENT	YES	NO
The cab rear skin shall be constructed from 3/16” (0.188”) 3003 H14 aluminum plate. Structural extrusions shall be used to reinforce the rear wall. The left-hand and right-hand cab side skins shall be constructed from 3/16” (0.188”) 3003 H14 smooth aluminum plate. The skins shall be welded to structural aluminum extrusions at the top, bottom, and sides for additional reinforcement. The cab front skins shall be constructed from 3/16” (0.188”) 3003 H14 smooth aluminum plate. The upper portion shall form the windshield mask, and the lower portion shall form the cab front. Each front corner shall have a full 9” outer radius for strength and appearance. The left-hand and right-hand sides of the windshield mask shall be welded to the left-hand and right-hand front door frames, and the upper edge of the windshield mask shall be welded to the cab roof perimeter extrusion for reinforcement. The cab front shall be welded to the subframe C-channel extrusion below the line of the headlights to provide protection against frontal impact. **Cab Exterior** The exterior of the cab shall be 94” wide x 130” long to allow sufficient room in the occupant compartment for up to eight (8) fire fighters. The cab roof shall be approximately 101” above the ground with the flat roof option. The back-of-cab to front axle length shall be a minimum of 58”. Front axle fenderette trim shall be brushed aluminum for appearance and corrosion resistance. Bolt-in front wheel well liners shall be constructed of 3/16” (0.188”) composite material to provide a maintenance-free, damage-resistant surface that helps protect the underside of the cab structure and components from stones and road debris. A large stainless-steel cooling air intake grille with an open area of no less than 81% shall be at the front of the cab. The cab windshield shall be of a two-piece replaceable design for lowered cost of repair. The windshield shall be made from 1/4” (0.25”) thick curved, laminated safety glass with a 75% light transmittance automotive tint. A combined minimum viewing area of 2,561-sq. in. shall be provided. Forward visibility to the ground for the average (50th percentile) male sitting in the driver`s seat shall be no more than 11 feet 7 inches from the front of the cab to ensure good visibility in congested areas. **Windshield Wipers** Two (2) opposed radial style windshield wipers with two (2) separate electric motors shall be provided for positive operation. The wipers shall be tested beyond the minimum SAE requirement to a total of 3.3 million cycles. The wipers shall be a wet-arm type with a one (1) gallon washer fluid reservoir, an intermittent-wipe		

REQUIREMENT	YES	NO
function, and an integral wash circuit. Wiper arm length shall be approximately 20”, and the blade length approximately 21”. Each arm shall have a 90 degree sweep for full coverage of the windshield. The wipers shall be synchronized so as to wipe each windshield simultaneously. **Cab Mounts and Cab Tilt System** The cab shall be independently mounted from the body and chassis to isolate the cab structure from stresses caused by chassis twisting and body movements. Mounting points shall consist of two (2) forward-pivoting points, one (1) on each side; two (2) intermediate rubber load-bearing cushions located midway along the length of the cab, one on each side; and two (2) combination rubber shock mounts and cab latches located at the rear of the cab, one (1) on each side. An electric-over-hydraulic cab tilt system shall be provided to provide easy access to the engine. It shall consist of two (2) large-diameter, telescoping, hydraulic lift cylinders, one (1) on each side of the cab, with a frame-mounted electric-over-hydraulic pump for cylinder actuation. Safety flow fuses (velocity fuses) shall be provided in the hydraulic lift cylinders to prevent the raised cab from suddenly dropping in case of a burst hydraulic hose or other hydraulic failure. The safety flow fuses shall operate when the cab is in any position, not just the fully raised position. The hydraulic pump shall have a manual override system as a backup in the event of an electrical failure. Lift controls shall be located in a compartment to the rear of the cab on the right side of the apparatus. A parking brake interlock shall be provided as a safety feature to prevent the cab from being tilted unless the parking break is set. The entire cab shall be tilted through a 42-45 degree arc to allow for easy maintenance of the engine, transmission and engine components. A positive-engagement safety latch shall be provided to lock the cab in the full tilt position to provide additional safety for personnel working under the raised cab. In the lowered position, the cab shall be locked down by two (2) automatic, spring-loaded cab latches at the rear of the cab. A ”cab ajar” indicator light shall be provided on the instrument panel to warn the driver when the cab is not completely locked into the lowered position. **Cab Interior** The interior of the cab shall be of the open design with an ergonomically-designed driver area that provides ready access to all controls as well as a clear view of critical instrumentation.		

REQUIREMENT	YES	NO
The engine cover between the driver and the officer shall be a low-rise contoured design to provide sufficient seating and elbow room for the driver and the officer. The engine cover shall blend in smoothly with the interior dash and flooring of the cab. An all-aluminum subframe shall be provided for the engine cover for strength. The overall height of the engine enclosure shall not exceed 23” from the floor at each side and 27” in the center section. The engine cover shall not exceed 41” in width at its widest point. The rear portion of the forward engine cover shall be provided with a lift-up door to provide easy access for checking and filling engine oil, transmission fluid and power steering fluid without raising the cab (a separate access panel shall be provided for the power steering when equipped with an X12 or X15 engine). The engine cover insulation shall consist of 1/2” closed cell elastomeric compound foam with aluminum foil faced fiberglass fabric manufactured to specifically fit the engine cover. All edges and seams shall be sealed using aluminum foil faced fiberglass tape. The insulation shall meet or exceed DOT standard FMVSS 302-1 and V-0 (UI subject 94 Test). All cab floors shall be covered with a black rubber floor mat that provides an aggressive slip-resistant surface in accordance with current NFPA 1901. The rear engine cover area shall be covered with molded 18 lb/cu. ft. (+/-0.5) flexible integral skinned polyurethane foam at a Durometer of 60 (+/- 5.0) per ASTM F1957-99. The cover shall be approximately .5" thick with a minimum skin thickness of 0.0625 inches. The cover shall be provided to reduce the transmission of noise and heat from the engine. The cover shall be black with a pebble grain finish for slip resistance. A minimum of 57.25” of floor-to-ceiling height shall be provided in the front seating area of the cab and a minimum of 55.25” floor-to-ceiling height shall be provided in the rear seating area. A minimum of 36” of seated headroom at the "H" point shall be provided over each fenderwell. The interior side to side dimensions shall be 87" from wall padding to wall padding and 89.5" from door to door. The floor area in front of the front seat pedestals shall be no less than 24" side to side by up to 25” front to rear for the driver and no less than 24" side to side by up to 27” front to rear for the officer to provide adequate legroom. Battery jumper studs shall be provided to allow jump-starting of the apparatus without having to tilt the cab.		

REQUIREMENT	YES	NO
All exposed interior metal surfaces shall be pretreated using a corrosion prevention system. The interior of the cab shall be insulated to ensure the sound (dbA) level for the cab interior is within the limits stated in the current edition of NFPA 1901. The insulation shall consist of 2 oz. wadding and 1/4” (0.25”) foam padding. The padding board shall be backed with 1/4” (0.25”) thick reflective insulation. The backing shall be spun-woven polyester. Interior cab padding shall consist of a rear cab headliner, a rear wall panel, and side panels between the front and rear cab doors. The vehicle shall use a seven-position tilt and telescopic steering column to accommodate various size operators. An 18” padded steering wheel with a center horn button shall be provided. The driver and officer seat risers shall be welded to the main cab floor structure. Depending on the make and model of the seats, a storage compartment with a hinged door shall be provided in the risers. The lower front cab steps shall be a minimum of 11.5” deep x 24” wide. The lower rear cab steps shall be a minimum 16” deep x 21” wide. The first step at the front and rear cab doors shall be no more than 24.0” above the ground with standard tires in the unloaded condition per NFPA 1901 standards. The front and rear steps shall incorporate full width intermediate steps for easy access to the cab interior. The intermediate step at the front doors shall be approximately 6" deep (minimum). The intermediate step at the rear doors shall be approximately 10.75" deep (minimum). The step surfaces shall be aluminum diamond plate with a multi-directional, aggressive gripping surface incorporated into the aluminum diamond plate in accordance with current NFPA 1901. A black grip handle shall be provided on the interior of each front door below the door window to ensure proper hand holds while entering and exiting the cab. An additional black grip handle shall be provided on the left and right side windshield post for additional handholds. **Cab Doors** Four (4) side-opening cab doors shall be provided. Doors shall be constructed of a 3/16” (0.188”) aluminum plate outer material with an aluminum extruded inner framework to provide a structure that is as strong as the side skins. Front cab door openings shall be approximately 36” wide x 72.5” high, and the rear cab door openings shall be approximately 33.75” wide x 72.5” high. The front doors shall open approximately 85 degrees, and the rear doors shall open approximately 80 degrees.		

REQUIREMENT	YES	NO
The doors shall be securely fastened to the doorframes with full-length, stainless steel piano hinges, with 3/8” (0.375”) diameter pins for proper door alignment, long life, and corrosion resistance. Mounting hardware shall be treated with corrosion-resistant material prior to installation. For effective sealing, an extruded rubber gasket shall be provided around the entire perimeter of all doors. The front door windows shall provide a minimum viewing area of 518 sq. in. each. The rear door windows shall provide a minimum viewing area of 554 sq. in. each. All windows shall have 75% light transmittance automotive safety tint. The door handles on the exterior of the cab shall be a pull type with vertical orientation. The handles shall be made with corrosion free material and have a black finish. Each exterior door handle shall have an integral keyed lock. Recessed paddle-style door latches shall be provided on the interiors of the doors. The latches shall be designed and installed to protect against accidental or inadvertent opening as required by NFPA 1901. The rear cab door handles shall have a vertical orientation making them easily accessible from forward or rearward outboard seating positions. Each cab door shall have a manually operated door lock actuated from the interior of each respective door. **Cab Instruments and Controls** Cab controls shall be located on the cab instrument panel in the dashboard on the driver`s side where they are clearly visible and easily reachable. Chassis operation switches shall be installed in removable panels for ease of service. The following gauges and/or controls shall be provided: • Speedometer/Odometer • Tachometer • Engine hour meter • Engine oil pressure gauge with warning light and buzzer • Engine water temperature gauge with warning light and buzzer • Transmission oil temperature gauge • Two (2) air pressure gauges with a warning light and buzzer (front air and rear air) • Fuel gauge with low fuel indicator light • Voltmeter • Master battery/ignition switch (rocker with integral guard) • Engine start switch (rocker) • Heater and defroster controls with illumination • Marker light/headlight control switch (rocker) • Panel light dimmer switch (rocker) • Self-canceling turn signal control with indicators • Windshield wiper switch with variable speed and washer controls • Pump shift control with green ”pump in gear” and ”o.k. to pump” indicator lights		

REQUIREMENT	YES	NO
• Parking brake controls with red indicator light on dash • Automatic transmission shift console • Electric horn button at center of steering wheel • Master warning light switch • Cab ajar warning indicator • Air filter restriction indicator Controls and switches shall be identified as to their function by backlit wording adjacent to each switch, or indirect panel lighting adjacent to the controls. **Electrical System** The cab and chassis system shall have designated electrical distribution areas. All electrical components shall be located such that standard operations shall not interfere with or disrupt vehicle operation. An access cover shall be provided for maintenance access to the electrical distribution area. Circuit protection shall be provided by fuses, thermal reset breakers and / or solid-state controls. A 6 place, constantly hot, and 6 place ignition switched fuse panel and ground for customer-installed radios and chargers shall be provided at the electrical distribution area. Radio suppression shall be sufficient to allow radio equipment operation without interference. All wiring shall be mounted in the chassis frame and protected from impact, abrasion, water, ice, and heat sources. The wiring shall be color-coded and functionally-labeled every 3” on the outer surface of the insulation for ease of identification and maintenance. The wiring harness shall conform to SAE 1127 with GXL temperature properties. Any wiring connections exposed to the outside environment shall be weather-resistant. All harnesses shall be covered in a loom that is rated at 280 degrees F to protect the wiring against heat and abrasion. **Daytime Running Lights** Two (2) dual rectangular chrome plated headlight bezels shall be installed on the front of the cab. The low beam headlights shall activate with the release of the parking brake to provide daytime running lights (DRL) for additional vehicle conspicuity and safety. The headlight switch shall automatically override the DRL for normal low beam/high beam operation. **Fast Idle System** A fast-idle system shall be provided and controlled by a switch accessible by the driver. The system shall increase engine idle speed to a preset RPM for increased alternator output.		

REQUIREMENT	YES	NO
Cab Crashworthiness Requirement The apparatus cab shall meet and/or exceed relevant NFPA 1901 load and impact tests required for compliance certification with the following: *Side Impact Dynamic Pre-Load per SAE J2422 (Section 5).* Testing shall meet and/or exceed defined test using 13,000 ft-lbs of force as a requirement. The cab shall be subject to a side impact representing the force seen in a roll-over. The cab shall exhibit minimal to no intrusion into the cab's occupant survival space, doors shall remain closed and cab shall remain attached to frame. Cab testing shall be completed using 13,776 ft-lbs of force **exceeding** testing requirements. *Quasi-static Roof Strength (proof loads) per SAE J2422 (Section 6) / ECE R29, Annex 3, paragraph 5.* Testing shall meet and/or exceed defined test using 22,046 lbs of mass as a requirement. Testing shall be completed using platen(s) distributed uniformly over all bearing members of the cab roof structure. Cab testing shall be completed using 23,561 lbs of mass **exceeding** testing requirements. The cab shall exhibit minimal to no intrusion into the cab's occupant survival space and doors shall remain closed. Additional cab testing shall be conducted using 117,336 lbs of mass **exceeding** testing requirements by **over five (5) times**. The cab shall exhibit minimal to no intrusion into the cab's occupant survival space and the doors shall remain closed. *Frontal Impact per SAE J2420.* Testing shall meet and/or exceed defined test using 32,549 ft-lbs of force as a requirement. The cab shall be subject to a frontal impact as defined by the standard. The cab shall exhibit minimal to no intrusion into the cab's occupant survival space, doors shall remain closed and cab shall remain attached to frame. Cab testing shall be completed using 34,844 ft-lbs of force **exceeding** testing requirements. Additional cab testing shall be conducted using 65,891 ft-lbs of force **exceeding** testing requirements by **over two (2) times**. The cab shall meet all requirements to the above cab crash worthiness; **NO EXCEPTIONS**.		

REQUIREMENT	YES	NO
A copy of a certificate or letter verifying compliance to the above performance by an independent, licensed, professional engineer shall be provided upon request. For any or all of the above tests, the cab manufacturer shall provide either photographs or video footage of the procedure upon request. **Seat Mounting Strength** The cab seat mounting surfaces shall be third party tested and in compliance with FMVSS 571.207. **Seat Belt Anchor Strength** The cab seat belt mounting points shall be third party tested and in compliance with FMVSS 571.210. **ISO Compliance** The manufacturer shall ensure that the construction of the apparatus cab shall be in conformance with the established ISO-compliant quality system. All written quality procedures and other procedures referenced within the pages of the manufacturer`s Quality Manual, as well as all Work Instructions, Workmanship Standards, and Calibration Administration that directly or indirectly impacts this process shall be strictly adhered to. By virtue of its ISO compliance the manufacturer shall provide an apparatus cab that is built to exacting standards, meets the customer`s expectations, and satisfies the customer`s requirements. **CAB ROOF TYPE** **Top Mount Pump Panel Enclosure** The rear portion of the cab roof shall be raised 24” to provide approximately 6` 7” of standing room. The front of the vista shall be sloped at 45 degrees from the vertical. The slope shall begin slightly in front of the centerline of the front axle in order to leave room for warning lights and air conditioning in front of the vista. The main roof extrusion shall extend up into the vista in order to strengthen the roof perimeter. The rear of the vista roof shall extend past the back of the cab to enclose the Top Mount Pump Panel Controls. Windows shall be provided on the front, sides, and rear of the vista unless otherwise specified. Fixed narrow windows shall also be provided on either side of the bottom of the extension (with narrow pump module only) to provide visibility to the side panels while standing at the top mount pump panel.		

REQUIREMENT	YES	NO
The rear door opening shall be approximately 95” vertically for improved ingress/egress characteristics. **Down View Windows** Small down view windows on each side of the pump control panel shall be provided. These shall be approximately 4” wide X 12” long. **Raised Roof** The rear portion of the cab roof shall be raised 24”. This will provide at least 6` 7” standing room. The front of the vista hood shall be sloped at 45 degrees from vertical. The slope shall begin slightly in front of the centerline of the front axle to leave room for warning lights and air conditioning in front of the vista. The main roof extrusion shall extend up into the vista to strengthen the roof perimeter. Windows shall be provided on front, side, and rear unless otherwise specified. The rear door shall have a 95” vertical dimension for improved ingress/egress characteristics. **CAB BADGE PACKAGE** **Logo Package** The apparatus shall have manufacturer logos provided on the cab and body as applicable. **CAB DOOR OPTIONS** **Cab Door Map Pockets** A mechanically fastened stainless steel map pocket shall be mounted on the front cab doors, centered on the kick plates. The map pockets shall be constructed of 14 gauge (.070) stainless steel. The dimensions of the map pocket shall be approximately 10” high x 14” wide x 3” deep. **Rear Cab Door Position** The cab rear doors shall be moved to the rear of the wheel opening. This door placement facilitates easier entry and egress by reducing the rear facing seat protrusion into the door opening. Rear door position to the 58” or (medium cab).		

REQUIREMENT	YES	NO
Cab Door Locks The cab shall have 1250 keyed door locks provided on exterior doors to secure the apparatus. **Cab Door Panels** The inner door panels shall be made from 14 gauge brushed finish stainless steel for increased durability. The cab door panels shall be split just below the handrail and incorporate an easily removable panel for access to the latching mechanism and window regulator for maintenance or service. **Cab Door Reflective Material** Reflective Diamond Grade material striping shall be provided approximately 12" high on the lower cab door panels. The stripes shall run from the top outer corner to the bottom inside corner of the lower door area, forming a "A" shape when viewed from the rear. The reflective material shall meet NFPA 1901 requirements. **Cab Door Locks** Each cab door shall have a manually operated door lock actuated from the interior of each respective door. Exterior of each cab door shall be provided with a keyed lock integrated with the cab door handle. **Door Mounted Flashing Lights** There shall be four (4) Weldon model 8401-0000-20 door mounted amber 16" x .75" LED flashing arrow strip lights with clear lenses (one per door) provided. The lights shall be located on each cab door in the outboard position. Each light shall be activated by the cab door ajar circuit. **Cab Front Door Windows** Full roll-down windows shall be provided for the front cab doors with power operated heavy duty regulators. The regulators shall have worm gear drive cable operation for positive movement and long life. Scissors or gear-and-sector drives are not acceptable. Window switches shall be located at the center dash for access by the driver or officer. **Cab Rear Door Windows** Full roll-down windows shall be provided for the rear crew doors with power operated heavy duty regulators. The regulators shall have worm gear drive cable		

REQUIREMENT	YES	NO
operation for positive movement and long life. Scissors or gear-and-sector drives are not acceptable. Window switches shall be located on each door with additional switches accessible by driver. **Cab Door Style** The cab doors shall extend down to cover lower step well. **CAB STEP OPTIONS** **Cab Step** An auxiliary step below the cab door shall be provided. The step shall be constructed of .188” aluminum treadbrite. The step surface shall be provided with an aggressive skid-resistant surface and have an open back. The step shall be in accordance with current NFPA requirements and shall include a multi-directional aggressive gripping surface incorporated into the diamond plate. The surface shall extend vertically from the diamond plate sheet a minimum of 1/8" (0.125"). Gripping surfaces shall be circular in design, a minimum of 1" diameter and on centers not to exceed 4". The step shall be located driver's front door, officer's front door, driver side rear door, officer side rear door. Steps under front cab doors shall not interfere with approach angle. **Cab Steps** The lower cab steps shall extend 3.5" past the side of the cab to provide increased surface area. **MIRRORS** **Mirror Extension** There shall be a 2” extension provided for each Ramco mirror. **Mirrors, Heated** Driver and officer cab mirrors to be heated. Includes all surfaces (flat and convex, as applicable). **Cab Mirrors** Two (2) Ramco model 6001FFR remote controlled aluminum mirrors shall be installed. The mirrors shall incorporate a full-face main section with a convex		

REQUIREMENT	YES	NO
mirror with housing model CAS750, mounted to the top. The adjustment of main sections shall be through dash mounted switches. Location: mounted on front corners of cab. **MISC EXTERIOR CAB OPTIONS** **Cab Windows Rear Wall** Fixed glass windows shall be supplied on either side of the cab, providing visibility at the rear. The windows shall be approximately 4” wide and approximately the same height as the door windows. **Cab Canopy Window** There shall be a fixed window provided between the front and rear doors on the driver`s side of the cab.  Window dimensions shall be as follows:  • 26.69"W x 24.5"H  **Cab Canopy Window**  There shall be a fixed window provided between the front and rear doors on the officer`s side of the cab. Window dimensions shall be as follows: • 26.69"W x 24.5"H **WINDOW TOP MOUNT SLIDING REAR** Sliding Rear Window The windows on the back of the vista roof extension shall slide open to provide additional visibility and ventilation for the rear personnel. **Front Mud Flaps** Black linear low-density polyethylene (proprietary blend) mud flaps shall be installed on the rear of the cab front wheel wells. The design of the mud flaps shall have corrugated ridges to distribute water evenly.		

REQUIREMENT	YES	NO
Handrails Cab door assist handrails shall consist of two (2) 1.25” diameter x 18” long 6063-T5 anodized aluminum tubes mounted directly behind the driver and officer door openings one each side of the cab. The handrails shall be machine extruded with integral ribbed surfaces to assure a good grip for personnel safety. Handrails shall be installed between chrome end stanchions and shall be positioned at least 2” from the mounting surface to allow a positive grip with a gloved hand. **Handrails** Cab door assist handrails shall consist of two (2) 1.25” diameter x 36” long 6063-T5 anodized aluminum tubes mounted directly behind the driver and officer rear door openings one each side of the cab. The handrails shall be machine extruded with integral ribbed surfaces to assure a good grip for personnel safety. Handrails shall be installed between chrome end stanchions and shall be positioned at least 2” from the mounting surface to allow a positive grip with a gloved hand. **Rear Cab Wall Construction** The rear cab wall shall be constructed using formed 3/16" aluminum smooth plate interlocking in aluminum extrusions. The smooth plate shall match the cab paint scheme. **Cab Wheel Well** The cab wheel well shall be increased in size to provide additional clearance for larger tires. The fender trim shall be adjustable in and out to better accommodate various wheel / tire offsets. **Receptacle Mounting Plate** A mounting plate shall be provided for the battery charger receptacle, battery charger indicator and if applicable the air inlet, etc. The plate shall be constructed of 14 gauge brushed finish stainless steel and be removable for service access to the receptacle(s) and indicator. **HVAC** **Heat, Supplemental** A single 40,000 BTU water heater shall be supplied in the front area of the cab. The unit shall heat the lower section of the driver`s and officer`s footwell.		

REQUIREMENT	YES	NO
Dual 23,000 BTU water heaters with diamond plate covers shall be supplied in the rear of the cab to heat the rear cab lower section. Dual climate control will be achieved via dual switches installed on a front instrument panel. On units with optional multiplex display climate control, the floor heaters shall be controlled through the HVAC screen in the display. **Air Conditioning** An overhead air-conditioner / heater system with a single radiator mounted condenser shall be supplied. The unit shall be mounted to the cab interior headliner in a mid-cab position, away from all seating positions. The unit shall provide fourteen (14) comfort discharge louvers, eight (8) to the back area of the cab, six (6) to the front area of the cab including one (1) each side outboard in the forward overhead console. These louvers will be used for both AC and heated air delivery. Two (2) additional large front louvers shall be damper controlled to provide defogging and defrosting capabilities to the front windshield as necessary. The unit shall consist of a high output evaporator coil and heater core with one (1) high output dual blower for front air delivery, and two (2) high performance single wheel blowers for rear air delivery. For improved corrosion resistance the evaporator shall have a hydrophilic blue fin coating. The control panel shall actuate the air-distribution system using electric actuators. The control panel shall allow blended airflow to both the comfort air vents and defrost vents. Separate three-speed blower switches shall be provided to independently control air speed for the front and rear blowers. The condenser shall be radiator mounted and have a minimum capacity of 65,000 BTUs and shall include a receiver drier. Performance Data: (Unit only, no ducting or louvers) • AC BTU: 55,000 • Heat BTU: 65,000 • CFM: 1300 @ 13.8V (All blowers) The compressor shall be a ten-cylinder swash plate type Seltec model TM-31HD with a capacity of 19.1 cu. in. per revolution. The system shall be capable of cooling the interior of the cab from 100 degrees ambient to 75 degrees or less with 50% relative humidity in 30 minutes or less.		

REQUIREMENT	YES	NO
SEATS **Cab Seats** All cab seats shall be Bostrom brand. **Seat, Driver** One (1) H. O. Bostrom 400 Series Sierra Air- 100RX4 suspension seats with high back styling shall be supplied for the ***driver position***. Features shall include: • Air-100 suspension assembly with weight, height and ride adjustment. • Built in lumbar support. • 4” vertical suspension motion. • 5” fore and aft adjustment. All seat positions shall have a bright red retractable 3-point lap and shoulder harness, providing additional safety and security for personnel. Extensions shall be provided with the seat belts so the male end can be easily grasped and the female end easily located while sitting in a normal position. **Seat, Officer** One (1) H. O. Bostrom 400 Series fixed seat with high back SCBA storage for the ***officer`s position*** shall be supplied. Features shall include: • Removable ”Store-All” side cushions. • Auto-pivot and return headrest to open for improved exit with SCBA. • 12.5” wide SCBA cavity to store leading SCBA Brands. • Built in lumbar support. • Replaceable seat, side and headrest cushions. All seat positions shall have a bright red retractable 3-point lap and shoulder harness, providing additional safety and security for personnel. Extensions shall be provided with the seat belts so the male end can be easily grasped and the female end easily located while sitting in a normal position. **Seat, Rear Facing – Driver Side** One (1) Bostrom 400 Series tanker 450 SCBA high back SCBA storage seat shall be provided in the rear facing position over the ***driver side wheel well***.		

REQUIREMENT	YES	NO
Features shall include: • Removable ”Store-All” side cushions. • Auto-pivot and return headrest to open for improved exit with SCBA. • 12.5” wide SCBA cavity to store leading SCBA Brands. • Built in lumbar support. • Replaceable seat, side and headrest cushions. All seat positions shall have a bright red retractable 3-point lap and shoulder harness, providing additional safety and security for personnel. Extensions shall be provided with the seat belts so the male end can be easily grasped and the female end easily located while sitting in a normal position. **Seat, Rear Facing – Officer Side** One (1) Bostrom 400 Series tanker 450 SCBA high back SCBA storage seats shall be provided in the rear facing position over the ***officer side wheel well***. Features shall include: • Removable ”Store-All” side cushions. • Auto-pivot and return headrest to open for improved exit with SCBA. • 12.5” wide SCBA cavity to store leading SCBA Brands. • Built in lumbar support. • Replaceable seat, side and headrest cushions. All seat positions shall have a bright red retractable 3-point lap and shoulder harness, providing additional safety and security for personnel. Extensions shall be provided with the seat belts so the male end can be easily grasped and the female end easily located while sitting in a normal position. **Seat Cover Material** All seats shall have vinyl seat cover material. **Seat, Rear Facing - Center** Two (2) Bostrom 400 series high back SCBA seat backs and a two (2) person bench style seat with a single bottom cushion shall be installed rear facing at the rear of the engine cover. Features shall include: • Removable ”Store-All” side cushions. • Auto-pivot and return headrest to open for improved exit with SCBA.		

REQUIREMENT	YES	NO
• 12.5” wide SCBA cavity to store leading SCBA Brands. • Built in lumbar support. • Replaceable seat, side and headrest cushions. All seat positions shall have a bright red retractable 3-point lap and shoulder harness, providing additional safety and security for personnel. Extensions shall be provided with the seat belts so the male end can be easily grasped and the female end easily located while sitting in a normal position. **Seat Fabric Color** All seats shall be gray in color. **Seating Capacity Tag** A tag that is in view of the driver stating seating capacity of six (6) personnel shall be provided. **SCBA Bracket SmartDock** A IMMI SmartDock Gen2 SCBA storage bracket shall be provided. The SmartDock is a strap-free docking station that offers single-motion SCBA insertion and hands-free release when the firefighter stands up to exit the seat. SmartDock has undergone extensive testing to ensure that it meets or exceeds industry standards. When evaluated to the NFPA 1901 Standard for Automotive Fire Apparatus, SmartDock met requirements for retaining both the cylinder and the pack in dynamic testing. Location: • officer's seat • rear facing driver's side • rear facing engine cover (2) • rear facing officer's side. **Seat Belt Extender** ReadyReach seat belt extenders shall be provided. The extender shall include an arm that places the shoulder belt D-loop in a closer, easier to reach location. The extenders shall be provided for the driver's seat, officer's seat, rear facing driver's side, rear facing engine cover, rear facing officer's side seat.		

REQUIREMENT	YES	NO
MAP BOXES **Map Box** An aluminum map/storage box shall be installed in the cab. The map box shall be constructed of 1/8” (.125) inch smooth aluminum. Hinged drop-down doors with push button latches, shall be installed on the front of the box for the access to the driver and officer side storage areas. Each storage area shall have two (2) fixed shelves for storage of ring binders, map books, etc. Each latch shall have a 25 lb. rating. The map box shall be mounted on the vertical uprights in the center of the cab between the driver and officer seating positions. The map box shall be secured and tested to meet with current NFPA requirements. Approximate overall dimension: 34” W x 9.50” H x 12” D. **Map Box Finish** The map box shall have Zolatone gray finish. **MISC INTERIOR CAB OPTIONS** **Cab Interior Color** Cab instrument panel, overhead console, trim panels, headliner, and door panels shall be gray. **Sun Visors** Lexan sun visors shall be provided for the driver and officer matching the interior trim of the cab and shall be flush mounted into the underside of the overhead console. **Mounting Plate on Engine Cover** An equipment mounting plate shall be provided between the driver and officer on the chassis engine cover. The plate shall be mounted to the engine access door spaced approximately 1/2" up to provide clearance for equipment mounting hardware. The plate shall be constructed of 3/16" aluminum plate and have a swirl finish.		

REQUIREMENT	YES	NO
Helmet Holder [Qty: 6] One (1) On Scene Solutions Talon helmet holder shall be provided to meet current requirements of NFPA 1901. Location: To be determined at prebuild meeting. **Engine Cover** The engine cover shall blend in smoothly with the interior dash and flooring of the cab. The upper left and right sides shall have a sloped transition surface running front to rear providing increased space for the driver and officer. The engine cover and engine service access door cover shall be molded 18 lb/cu. ft. (+/-0.5) flexible integral skinned polyurethane foam at a Durometer of 60 (+/- 5.0) per ASTM F1957-99. The cover shall be approximately .5" thick with a minimum skin thickness of 0.0625 inches. The cover shall be provided to reduce the transmission of noise and heat from the engine. The cover shall be black and feature a pebble grain finish for slip resistance. **Cup Holders** Two (2) cup holders shall be provided on the cab engine cover. The cup holders shall be molded 18 lb/cu. ft. (+/-0.5) flexible integral skinned polyurethane foam at a Durometer of 60 (+/- 5.0) per ASTM F1957-99 and with a minimum skin thickness of 0.0625 inches. The outer surface of the cup holders shall be black with a pebble grain finish and shall include a removable plastic liner. The cup holders shall be located Driver and officer side of engine cover slightly ahead of access door spaced approximately 20" apart (center to center). **Rear Facing Storage** Recessed storage areas shall be provided in the rear face of the cab wheel well risers. **Overhead Console** An overhead console shall be provided in the front of the cab for the driver and officer. The areas in front of the driver and officer shall be removable panels that can be used for switches and other electrical items. The entire overhead console shall be hinged for service access. The center of the overhead console shall have a lowered area for mounting of up to three (3) electrical components like siren heads, directional bar controllers, etc.		

REQUIREMENT	YES	NO
The overhead console shall be constructed of aluminum smooth plate painted to match the cab interior. The console shall be installed using stainless steel fasteners. **Rear Engine Cover** The rear engine cover shall be provided with a reduced profile for increased legroom on the forward facing rear inboard seats. **Cab Dash - Low Profile Severe Duty** The driver side and center dash shall be constructed from cast aluminum for durability and long life. The driver side cast aluminum dash shall enclose the instrument cluster. The center dash area shall be a low-profile design to provide optimal forward visibility. The driver and officer sides shall be angled for ergonomic access and designed for either a color display or switches. Access panels shall be provided on the top, front and officer side for easy service access. The officer side dash shall be low profile and constructed from .125" smooth aluminum plate. A service access panel shall be provided in the top surface. The driver, center and officer side dash shall be painted to match the cab interior. The lower kick panels below the dash to be constructed from .125 aluminum plate painted to match the cab interior. The panels shall be removable to allow for servicing components that may be located behind the panels. **Cab Insulation Package** The cab shall be insulated to mitigate noise and ensure maximum cooling/heating capacity. The insulation package shall include 1" Polyester foam with Mylar facing for the front wall, rear wall, side walls, and ceiling, Reflectex (or equal) inside each cab door and 1" closed cell foam insulation below the front and rear facing seat risers. **CAB ELECTRICAL OPTIONS** **Cab Swivel Lights** An interior cab light unit shall be mounted in the headliner consisting of two (2) side ball-joint socket spot lamps. Each light shall be individually switched.		

REQUIREMENT	YES	NO
Cab Dome Lights- Additional Dome light assemblies consisting of a two-position assembly mounted rocker switch; LED 4” dome light with red lens and plastic housing shall be installed. There shall be two mounted in the rear of the cab, one in the driver side and one in the officer side ceiling towards the rear and over the pump control panel. **Cab Dome Lights - Main** Five (5) ceiling mounted dome light assemblies shall be provided. Each light shall consist of a three-position assembly mounted rocker switch, LED (light emitting diode) 4” grommet mount white dome light, LED (light emitting diode) 4” grommet mount red dome light, and a plastic housing. The white light activates with appropriate cab door and light assembly mounted rocker switch. The red light activates with assembly mounted rocker switch only. Two (2) lights shall be located in the front of the cab and three (3) lights shall be located in the rear of the cab. **Auto-Eject Battery Charger Receptacle** The battery charger receptacle shall be a Kussmaul 20-amp NEMA 5-20 Super Auto-Eject #091-55-20-120 with a cover. The Super Auto-Eject receptacle shall be completely sealed and have an automatic power line disconnect. The receptacle shall be located outside driver's door next to handrail and the cover color shall be Yellow. **Horn Button Switch** A two (2) position rocker switch shall be installed in the cab accessible to the driver and properly labeled to enable operator to activate the OEM traffic horn or air horn from the steering wheel horn button. **Auto Transfer Switch – Apparatus AC Power** An automatic transfer switch shall be installed to allow all interior receptacles to be powered either by the shore power receptacle or the on-board generator. The system shall include an eight (8) place breaker box for the interior receptacles.		

REQUIREMENT	YES	NO
ATC Override An Automatic Traction Control (ATC) override switch shall be provided. The switch shall be located within reach of the driver and allow for momentary disabling of the ATC system due to mud or snow conditions. **Metric Display Gauge Cluster** The cab operational instruments shall be located in the dashboard on the driver side of the cab and shall be clearly visible. The Speedometer/Odometer in this panel shall have a Metric display. All other gauges shall be dual read. The following gauges shall be included in the cluster: • Speedometer/Odometer • Tachometer with integral hour meter • Engine oil pressure gauge with warning light and buzzer • Engine water temperature gauge with warning light and buzzer • Two (2) air pressure gauges with a warning light and buzzer (front air and rear air) • Fuel gauge • Voltmeter • Transmission oil temperature gauge This panel shall be back-lit for increased visibility during day and nighttime operations. **Radio Speakers Additional Pair (For AM/FM Weatherband Radio)** An additional pair of radio speakers shall be supplied. Rear speakers mounted in rear headliner. Speakers shall be 5-1/4” diameter. **Headlights** The front of the cab shall have four (4) headlights. The headlights shall be mounted on the front of the cab in the upper position. The headlights shall be day time operational. **Battery Saver** A Kussmaul 091-195-12 Battery Saver shall be installed. The battery saver shall provide 20 amps of DC output for 12-volt accessories. The unit shall be equipped with an automatic transfer relay to return loads to the chassis batteries when the 120 VAC power is disconnected.		

REQUIREMENT	YES	NO
The unit shall have a three-year warranty. **12 Volt (or 24 Volt) Outlet** A plug-in type receptacle for hand held spotlights, cell phones, chargers, etc. shall be installed officer side dash. The receptacle shall be wired battery hot. **Pre-Wire** The chassis shall be pre-wired for installation of tire chains. A lock-out/safety rocker style switch shall be installed for activation. **Windshield Fans – Front and Rear** Two (2) adjustable windshield defogger fans with individual switches shall be mounted in the cab centered below the overhead console. The fans shall be 12 volt and shall each be rated at 250 cfm. Location: • centered below overhead console • each side rear corner of vista roof. **Antenna Base – Kentville FD Radio / NS Trunked Radio** There shall be a Tessco P/N 90942 universal antenna base mounted on the cab roof with a weatherproof connector. The antenna base shall be NMO Motorola Style (equivalent to a MATM style) with RG58U coax cable. The antenna shall be located: • driver side forward with coaxial cable terminating at the center of the dash board • officer side forward with coaxial cable terminating at the center of the dash board. **Battery Charger Location** The battery charger shall be located behind driver's seat. **Officer Speedometer** A speedometer shall be provided in the officer side multiplex display in the cab.		

REQUIREMENT	YES	NO
Battery Saver Location The battery saver shall be located adjacent to primary battery charger. **Programming Instructions** Auxiliary switch 1 on the steering wheel switch pod shall be programmed to operate the Q2B. **Programming Instructions** Auxiliary switch 2 on the steering wheel switch pod shall be programmed to operate the Q2B Brake. **Programming Instructions** Auxiliary switch 3 on the steering wheel switch pod shall be programmed to operate the front brow light(s). **Cab USB Charging Port** A dual USB charging port with 2.1A total power for cell phones, chargers, etc. shall be installed In cab driver side on 3 x 3 post rear facing just above engine cover (or seat riser if in a Hush), In cab officer side on 3 x 3 post rear facing just above engine cover (or seat riser if in a Hush), officer side dash. The receptacles shall be wired battery hot. **Battery Charger** A Kussmaul LPC 80 battery charger with remote mounted LED display shall be installed. A fully automatic charging system shall be installed on the apparatus. The system shall have a 120-volt, 60 hertz, 13 amp AC input with an output of 80 amps 12 volts DC. The battery charging system shall be connected directly to the shoreline to ensure the batteries remain fully charged while the vehicle is in the fire station or firehouse. The system shall include a remote charging status indicator panel. The panel shall consist of a bar graph to provide a visual signal if battery voltage is good or drops below 11.5 volts. The microprocessor shall be continuously powered from the battery to provide the charge status.		

REQUIREMENT	YES	NO
DPF Regeneration Override A momentary override switch shall be provided for the Diesel Particulate Filter (DPF) regeneration. The switch will inhibit the regeneration process until the switch is reset or the engine is shut down and restarted. The switch shall be located within reach of the driver. **Steering Wheel Switches** The steering wheel shall be supplied with two (2) switch pods. Each switch pod shall include five (5) switches. The pods shall include switching for: • wipers • master warning and air horns • In addition, there shall be three (3) auxiliary switches that can be programmed to meet department specified functions. The wiper switches shall include high / low speed, intermittent, wipe / wash and off. The wiper motors shall be synchronized so as to wipe each windshield simultaneously. **Special Programming Instructions** The engine brake switch shall also have a manual switch in the overhead driver position in addition to any switching in the steering wheel smart pod. **Radio** The apparatus cab shall be equipped with a Delphi model PP105713 heavy duty AM/FM/Weather band stereo receiver. The unit shall include a compact disc player, front auxiliary input and front USB port. Two (2) 5-1/4” radio speakers and antenna shall be supplied and mounted in the padding adjacent to driver and officer seats. The receiver unit shall be suppressed from engine noise to provide clear sound through the speakers. Location: • center overhead console offset to officer side.		

REQUIREMENT	YES	NO
Cab Headlights FireTech model FT-4x6-4KIT LED headlights shall be provided. Headlights shall include low beam, high beam, elliptical beam and an integrated halo ring park lamp. **Cab Door Step Area Lighting** There shall be eight (8) clear TecNiq model D07 LED lights provided to illuminate the cab step well areas. Two (2) lights shall be located at each door area, one (1) above each step. The lights shall have polished stainless steel housings. The lights shall be activated by the cab door ajar circuit. **Cab Turn Signals** A pair of TecNiq LED (Light Emitting Diode) turn signal lights with clear lens shall be installed on the front of the cab. The strip type lights shall be 1.25" high x 15" long and be mounted in a polished cast aluminum housing between the quad bezels. **BODY COMPT LEFT SIDE** **Driver Side Assembly** The driver side assembly shall be constructed entirely of aluminum extrusions and interlocking aluminum plates. This aluminum modular design shall provide a high strength-to-weight ratio for increased equipment carrying capacity. The driver side body corners shall be 6063-T5 extruded aluminum corner sections with a 3/16” (0.188”) wall thickness. The side body extrusions shall be 6063-T5 aluminum tubing with a 3/16” (0.188”) wall thickness and 3/16” (0.188”) outside corner radius. The corners and sides shall be welded both internally and externally at each joint using an aluminum alloy welding wire. The driver side body shall be completely sanded and deburred to assure a smooth finish and painted job color. **Driver Side Compartments** The three (3) driver side compartments shall be constructed from 3003 H14 1/8” (.125”) smooth aluminum plate. The compartments shall be modular in design and shall not be a part of the body support structure. There shall be one (1) compartment located ahead of the rear wheels. This compartment shall be approximately 42” wide x 68” high x 26” deep in the lower 30” high section and 12” deep in the upper 38” high section. The compartment		

REQUIREMENT	YES	NO
shall contain approximately 30 cu. ft. of combined storage space. The door opening shall be approximately 42” wide x 68” high. There shall be one (1) compartment located over the rear wheel. The compartment shall be approximately 56” wide x 34” high x 12” deep and contain approximately 13.2 cu. ft. of storage space. The door opening shall be approximately 56” wide x 34” high. There shall be one (1) compartment located behind of the rear wheels. This compartment shall be approximately 56” wide x 68” high x 26” deep in the lower 30” high section and 12” deep in the upper 38” high section. The compartment shall contain approximately 40 cu. ft. of combined storage space. The door opening shall be approximately 56” wide x 68” high. Each compartment seam shall be sealed using a permanent pliable silicone caulk. The walls of each compartment shall be machine-louvered for adequate ventilation. An externally-mounted compartment top shall be provided and constructed of a 1/8” (.125”) aluminum treadplate. **Driver Side Roof Top Compartments** Driver side roof compartment shall be provided. The compartment shall be constructed of 1/8" (.125") aluminum treadplate. The compartment shall have vertical hinged access door at the rear constructed of 1/8” (.125”) smooth plate aluminum painted job color. The access door shall include push button latch and be wired to the door ajar indicator in the cab. *NOTE: This door shall be covered in chevron to match the balance of the apparatus rear.* Lighting shall be provided for the compartment. The light(s) shall illuminate when the access door is in the open position. **Roof Top Compartment Contents** Driver side roof top compartment contents: (2) 6" x 10' hard suction hoses stored vertical. Includes: poly type flooring & partition around hard suction hoses.		

REQUIREMENT	YES	NO
BODY COMPT RIGHT SIDE **Officer Side Roof Top Compartments** Two (2) officer side roof compartments shall be provided. The compartments shall be integral to the officer side assembly. The compartments shall be transverse front to rear and shall include flooring. The flooring shall be smooth plate and shall have drain holes to prevent the accumulation of water. The compartment top lids shall be raised and constructed of 1/8" (.125") aluminum treadplate. The lids shall include stainless steel hinges and shall be hinged to the outside of the compartment. Each lid shall include turn latches, grab handle(s) and be wired to the door ajar indicator in the cab. Lighting shall be provided for each compartment. Three (3) EON LED lights shall illuminate when the compartment lid is in the open position. **Officer Side Assembly** The officer side assembly shall be constructed entirely of aluminum extrusions and interlocking aluminum plates. This aluminum modular design shall provide a high strength-to-weight ratio for increased equipment carrying capacity. The officer side body corners shall be 6063-T5 extruded aluminum corner sections with a 3/16" (0.188") wall thickness. The side body extrusions shall be 6063-T5 aluminum tubing with a 3/16" (0.188") wall thickness and 3/16" (0.188") outside corner radius. The corners and sides shall be welded both internally and externally at each joint using an aluminum alloy welding wire. The officer side body shall be completely sanded and deburred to assure a smooth finish and painted job color. **Officer Side Compartments** The three (3) officer side compartments shall be constructed from 3003 H14 1/8" (.125") smooth aluminum plate. The compartments shall be modular in design and shall not be a part of the body support structure. There shall be one (1) compartment located ahead of the rear wheel. The compartment shall be approximately 42" wide x 68" high x 26" deep in the lower 30" high section and 12" deep in the upper 38" high section. The compartment shall contain approximately 30 cu. ft. of combined storage space. The door opening shall be approximately 42" wide x 68" high.		

REQUIREMENT	YES	NO
There shall be one (1) compartment located over the rear wheel. The compartment shall be approximately 56” wide x 34” high x 12” deep and contain approximately 13.2 cu. ft. of storage space. The door opening shall be approximately 56” wide x 34” high. There shall be one (1) compartment located rearward of the rear wheel. The compartment shall be approximately 56” wide x 68” high x 26” deep in the lower 30” high section and 12” deep in the upper 38” high section. The compartment shall contain approximately 40 cu. ft. of combined storage space. The door opening shall be approximately 56” wide x 68” high. Each compartment seam shall be sealed using a permanent pliable silicone caulk. The walls of each compartment shall be machine-louvered for adequate ventilation. An externally-mounted compartment top shall be provided and constructed of a 1/8” (.125”) aluminum treadplate. **Storage Tunnel** The area directly behind the upper area of the officer side compartments shall be for the storage of NFPA equipment. *NOTE: This door shall be covered in chevron to match the balance of the apparatus rear.* **BODY COMPT REAR** **Rear Body Assembly** The rear body shall be constructed entirely of aluminum extrusions and interlocking aluminum plates and includes a full height center rear compartment. The rear body frame shall be 6063-T5 1.5” x 4” and 1.5” x 3” aluminum extrusions with a 3/16” (0.188”) wall thickness and 3/16” (0.187”) outside corner radius and 1/8” (0.125”) aluminum smooth plate. The rear extrusions shall be welded both internal and external at each joint using an aluminum alloy welding wire. **Rear Body Compartment** The full height center rear compartment shall be constructed from 3003 H14 1/8” (.125”) smooth aluminum plate. The compartment shall be modular in design and shall not be a part of the body support structure.		

REQUIREMENT	YES	NO
The compartment shall be approximately 38” wide and shall vary in height and depth dependent upon water tank capacity. The compartment seams shall be sealed using a permanent pliable silicone caulk. Machined louvers shall be provided for adequate ventilation. **Storage Compartments** A storage compartment shall be provided at the rear body compartment. The storage compartment shall be located to the officer side of the rear compartment. The storage compartment shall be approximately 13” wide x 29” high x length of side assembly. The storage compartment shall store NFPA equipment. The storage compartment shall include a vertical hinged door to secure contents. The door shall be constructed of 3/16” (.187”) aluminum smooth plate and shall have a push-button style latch. The compartment door shall be securely attached with a full-length stainless steel piano type hinge with 1/4” pin (outboard standard design, inboard when rear body includes beaver tail). The hinge shall be “staked” on every other knuckle to prevent the pins from sliding. The door shall be wired to the door ajar indicator light in the cab and shall be interlocked with the parking brake per NFPA. *NOTE: This door shall be covered in chevron to match the balance of the apparatus rear.* **Tailboard Step** A tailboard step shall be provided at the rear of the body. The tailboard shall 12" in depth and in accordance with NFPA in both step height and stepping surface. The maximum rear step height to the tailboard shall not exceed 24". The tailboard step shall be formed from 3/16" (0.188") aluminum treadplate and shall be reinforced with 6063-T5 1.5" x 3" aluminum extrusion. The tailboard shall be in accordance with current NFPA requirements and shall include a multi-directional aggressive gripping surface incorporated into the diamond plate. The surface shall extend in a vertical direction from the diamond plate sheet a minimum of 1/8" (0.125") Gripping surfaces shall be circular in design, a minimum of 1" diameter and on centers not to exceed 4". The tailboard step shall be bolted on to the body from the underside assuring a clear surface and shall be easily removable for replacement in the case of damage.		

REQUIREMENT	YES	NO
Rear Access Handrails Handrails shall be provided at the rear of the body to assist ground personnel accessing the tailboard step and hosebed area. Each handrail shall be constructed of 6063T5 1.25" OD anodized aluminum tube, with an integral ribbed surface to assure a good grip for personnel safety, and shall be mounted between chrome stanchions. The handrails shall be located- one (1) appropriately sized handrail mounted vertical on the trailing edge of the body opposite side of the rear access ladder and appropriately sized handrail(s) mounted horizontal below the rear hosebed opening. **DOORS** **Roll Up Compartment Door** An AMDOR brand roll up door with satin finish shall be provided on a compartment. The door(s) shall be installed in the following location(s): L1, L3, R1, R3, B1. The door slats shall be 1" aluminum double wall slats with continuous ball & socket hinge joint and recessed dual durometer slat seal, double wall reinforced bottom panel with stainless steel lift bar latching system, bottom panel flange with cut-outs for ease of access with gloved hands, reusable slat shoes with positive snap-in securement, smooth interior door curtain to prevent equipment hang-ups. The slats shall have interlocking end shoes on each slat. The slats shall have interlocking joints with a PVC/vinyl inner seal to prevent any metal to metal contact and inhibit moisture and dust penetration. The track shall be a one-piece aluminum door track / side frame, top gutter with non-marring seal, non-marring recessed side seals with UV stabilizers to prevent warpage, dual leg bottom seal, with all wear component material to be Type 6 Nylon. The track shall have a replaceable side seal to prevent water and dust from entering the compartment. Door ajar switch system shall be magnetic proximity-based components. Door striker will include support beneath the lift bar to prevent door curtain bounce. The door opening shall be reduced by 2" in width and approximately 8-9" in height depending on door height.		

REQUIREMENT	YES	NO
Roll Up Compartment Door An AMDOR brand roll up door with satin finish shall be provided on a compartment. The door(s) shall be installed in the following location(s): L2, R2. The door slats shall be 1” aluminum double wall slats with continuous ball & socket hinge joint and recessed dual durometer slat seal, double wall reinforced bottom panel with stainless steel lift bar latching system, bottom panel flange with cut-outs for ease of access with gloved hands, reusable slat shoes with positive snap-in securement, smooth interior door curtain to prevent equipment hang-ups. The slats shall have interlocking end shoes on each slat. The slats shall have interlocking joints with a PVC/vinyl inner seal to prevent any metal to metal contact and inhibit moisture and dust penetration. The track shall be a one-piece aluminum door track / side frame, top gutter with non-marring seal, non-marring recessed side seals with UV stabilizers to prevent warpage, dual leg bottom seal, with all wear component material to be Type 6 Nylon. The track shall have a replaceable side seal to prevent water and dust from entering the compartment. Door ajar switch system shall be magnetic proximity-based components. Door striker will include support beneath the lift bar to prevent door curtain bounce. The door opening shall be reduced by 2” in width and approximately 8-9” in height depending on door heigh t. **Drip Pan** Drip pan for a roll-up door (EA). Location(s): L1, L2, L3, R1, R2, R3, B1. **Strap for Roll-Up Door** A bungee type strap shall be provided on the roll-up doors to assist in closing the door. The strap shall be affixed to both the door and the interior so the strap stays inside the compartment when lowering. The strap shall be provided on full height and high side (upper) compartments. **SHELVES** **Permanent Shelf [Qty: 2]** There shall be a permanent mounted shelf provided for a compartment as specified. The shelf shall be at the offset (unless otherwise specified) within the compartment.		

REQUIREMENT	YES	NO
The shelf shall have a minimum 2” front lip for added strength and reinforcement and to accommodate optional plastic interlocking compartment tile systems. The shelf shall be capable of holding 100 lbs. Aluminum bodies: Material to be 3/16" (.188") thick aluminum smooth plate. Stainless steel bodies: 12-gauge smooth plate 304L stainless steel. • R1 and R3 at top of offset **Adjustable Shelf [Qty: 6]** There shall be an aluminum adjustable shelf provided for a compartment as specified. The shelf shall be constructed of 3/16” (.187”) smooth aluminum plate. The shelf shall have a minimum 2” front and rear lips to accommodate optional plastic interlocking compartment tile systems and shall be capable of holding 100 lbs on compartments with tracks mounted on back wall (compartments up to approximately 12" deep) or shall be capable of holding 250 lbs with tracks mounted on forward and rearward walls. The shelf shall be sized, width and depth, to match the size and location in the compartment. • L1 / R1 upper / R3 upper and L3 between forward wall and fixed partition (Qty 2) • B1 below cable reel. **Adjustable Tracks [Qty: 4]** Tracks shall be provideed in the compartment as specified for use with adjustable shelves and/or trays in deep non-transverse compartments. The tracks shall be vertical mounted and attached to the side and/or rear walls of the compartments. • L1 / L3 / R1 and R3 **COMPARTMENT DIVIDERS** **Partition Vertical Bolt-In** Partition, bolt-in vertical partition wall. Locate in a compartment as specified. Partition constructed out of 3/16" 3003 smooth plate.		

REQUIREMENT	YES	NO
• L3 approximately 20 in. off forward wall **TRAYS / TOOLBOARDS** **Roll-Out Tray [Qty: 4]** There shall be a floor mounted roll-out tray provided in a compartment as specified. The roll-out tray shall be constructed of 3/16” (.187”) smooth aluminum plate with a sanded finish and welded corners for increased strength and rigidity. The tray shall be sized in width and depth as applicable. For greater tray accessibility, the drawer slides shall feature one hundred percent extension. The tray shall utilize a gas spring to secure the tray in the open or closed position. The tray shall have a total capacity of 500 lbs. • L1 / L3 ahead of fixed partition / R1 and R3 **Roll-Out Tray** There shall be an adjustable roll-out tray provided in a compartment as specified. The roll-out tray shall be constructed of 3/16” (.187) smooth aluminum with welded corners for strength and rigidity. The tray shall be sized in width and depth as applicable. For greater tray accessibility, the drawer slides shall feature one hundred percent extension. The tray shall utilize a gas shock to hold the tray in an open or closed position. The tray shall have a total capacity of 500 lbs. • L1 **Swing-Out Tool Board [Qty: 2]** A Pac Trac swing out aluminum tool board(s) shall be provided for a compartment as specified. • The swing out tool board provides two mounting surfaces by utilizing PAC Double Face Dual Trac aluminum extrusion. • This product is sold as a combination of P/N PM-1000, Pivot Mount Assembly and PAC Double Face Dual Trac aluminum extrusion P/N 7040.		

REQUIREMENT	YES	NO
The amount and size of the aluminum extrusion is determined by the compartment size and/or the customer requirements. Board heights are in 5-3/4" increments. • Compatible with all PAC tool brackets. • Locks in closed and open positions for stability. • Flexible mounting. Left or right hand opening. The tool board shall be mounted hinged to the front of the compartment (unless otherwise stated in location). Toolboard shall be rated to support up to 100 lbs. • L2 and R2 **Tool Board PAC TRAC [Qty: 2]** Tool Board, Pac TRAC brand double-sided adjustable slide out tool board on slide model VSO-24 shall be provided in a compartment as specified. • The Vertical Slide Out P/N VSO-24 is a double sided full extension slide out mounting product. 24 inches of travel. • Equipment mounting on both sides of panel. • Compatible with all PAC tool brackets. • 250lb capacity. • Locks in closed and open positions for stability. The tool board shall be mounted at top and bottom on adjustable tracking for ease of placement. The capacity rating shall be 250 lbs. maximum at full extension. • L3 between fixed partition and rear wall **COVERS** **Crosslay Cover** A crosslay cover shall be provided for the crosslay storage area of the pump module. The crosslay cover shall be provided in compliance with NFPA 1901. The crosslay cover shall be constructed from 3/16” (.187”) aluminum treadplate. The cover shall include a full-length stainless steel 1/4” (0.25”) rod piano-type hinge. The cover shall be hinged to open and not interfere with applicable plumbing components on the apparatus.		

REQUIREMENT	YES	NO
The crosslay cover shall include applicable grab handle(s) and two (2) butterfly style latches to secure the cover in the closed position. **Crosslay Cover Hinge** The crosslay cover shall be hinged along the rearward edge of the crosslay area. **Crosslay Cover - Sides** A pair of covers constructed of Black 18 oz. PVC vinyl coated polyester shall be installed over the side openings of the apparatus crosslay. The base fabric shall be 1000 x 1300 Denier Polyester with a fabric count of 20 x 20 square inch. The covers shall be secured in place to comply with the latest edition of NFPA 1901. **Speed Lay Covers - Sides** A pair of covers constructed of Black 18 oz. PVC vinyl coated polyester shall be installed over the side openings of the apparatus speed lays. The base fabric shall be 1000 x 1300 Denier Polyester with a fabric count of 20 x 20 square inch. One pair per stacked speed lay. One pair per opening for side by side speed lay. The covers shall be secured in place to comply with the latest edition of NFPA 1901. **Hold Open** Hold open device(s) shall be provided for aluminum crosslay (single or bi-fold) cover. **NFPA Hosebed Cover** The hose bed area shall have a two (2) piece aluminum hose bed cover. The hose bed cover shall be provided in compliance with NFPA. Each hose bed cover shall be constructed of an aluminum tubing frame with a 1/8” (.125”) aluminum treadplate top and a 3/32” (.094”) aluminum smooth plate bottom. (**No Exceptions**). Each cover door shall be securely attached to the hose bed side with a full-length, stainless steel, piano type hinge. The hinge shall have 1/4” pins and shall be ”staked” on every other knuckle to prevent pin slippage.		

REQUIREMENT	YES	NO
The forward area of each cover shall have one (1) electric actuator with adjustable limit switches for retraction and extension of the actuator. Access doors shall be provided to easily disengage the T-Style securing pin to deploy the covers manually in case of power failure along with a hold open mechanism. Each cover door shall be wired to the door ajar indicator light in the cab and shall be interlocked with the parking brake per NFPA. The water tank fill tower(s) shall be accessible with the covers in the closed position through a diamond plate door. The fill tower access door shall be constructed of 3/16” (.187”) aluminum treadplate. The door shall be hinged and shall include one (1) hold down and grab handle. The covers shall be supported in the closed position by a center mounted hose bed divider. The divider shall be constructed of 1/4”(.25”) smooth aluminum plate with a DA type finish. The divider shall run the full length of the hose bed (as applicable) and shall include an upper ”C” channel extrusion base. The rear of the center mounted divider shall include a recessed area to allow for looping of hose from one side of the divider to the other. Each cover shall include two (2) assist handles- one (1) grab handle and one (1) handrail (rearward cover).The rearward handrails shall be installed in compliance with current NFPA. The handrails shall be constructed of 6063T5 1.25” OD anodized aluminum tube, with an integral ribbed surface to ensure a good grip, and will be mounted between stanchions. Includes control panel on rear body driver's side **Rear Hose Bed Cover** A cover constructed of [#COL] 18 oz. PVC vinyl coated polyester shall be installed at the rear apparatus hose bed. The base fabric shall be 1000 x 1300 Denier Polyester with a fabric count of 20 x 20 per square inch. The top of the cover shall be mechanically attached to the rear hose bed cover extrusion, and with over lapping flaps in the center secured with velcro. The lower portion of the cover shall be secured in place with heavy duty nylon straps to comply with the latest edition of NFPA 1901. The lower portion fasteners shall be mounted at pick up. Color: Black.		

REQUIREMENT	YES	NO
PUMP MODULE **Pump Module Width** Pump module shall be 76" wide. **Pump Module** **Pump Module Frame** An extruded aluminum pump module shall be provided and located forward of the apparatus body. The pump module shall be constructed entirely of welded aluminum alloy extrusions and interlocking aluminum plates. The pump module framework shall consist of 1.5" x 3" x .188" wall, 1.5" x 3" x .375" wall with center web and 3" x 3" x .188" wall extrusions. The pump module design and mounting shall be separate from the body to allow the pump module and body to move independently of each other in order to reduce stress from frame twisting and vibration. **Pump Module Mounting** The pump module shall be attached to the chassis using four (4) center bonded isolation mounts and a steel mounting frame. The isolation mounts shall be 2.75" diameter and mount to the chassis with two (2) 4" x 4" x .312" A36 steel angles. **Pre-connect Storage** Two (2) transverse storage areas shall be incorporated into the module to accommodate preconnected handlines. Plumbing for the handlines shall be located at the upper back wall of the storage area to facilitate use of optional removable trays. The floors of the pre-connect areas shall be constructed from .125" smooth aluminum plate. The floors shall be slotted to prevent the accumulation of water and allow for ventilation of wet hose. **Top Mounted Pump Control Area** The upper area of the module shall be configured for a top mount pump operator`s panel. The upper side walls of the module shall be notched rearward to the speedlay area and tapered for improved operator visibility. **Pump Module Running Boards** The pump module shall include a running board on each side. The running boards shall be in accordance with NFPA in both step height and stepping surface. The running boards shall be formed from .125” aluminum		

REQUIREMENT	YES	NO
treadplate. Each running board shall be bolted on to the pump module and be easily removable for replacement in the case of damage. **Stepping Surfaces** The top mount crosswalk and each running board shall include a multi-directional, aggressive gripping surface incorporated into the treadplate. The surface shall extend vertically from the diamond plate sheet a minimum of .125". Gripping surfaces shall be circular in design, a minimum of 1" diameter and on centers not to exceed 4". **Pump Module Height** The pump module height shall be 85". **Top Mount Enclosed Pump Control Area** The upper area of the module shall be configured for a top mount pump operator`s panel enclosed inside the cab. **PUMP PANELS** **Top Mount Pump Panels** The top mount gauge panel, driver and officer side pump panels shall be constructed of 14-gauge stainless steel. The top mount gauge panel shall be able to lift forward for access to panel mounted electrical connections. The driver and officer panels shall have the ability to be removed from the module for easier access and for maintenance in the pump area. **Pump Access Doors** The driver and officer side pump module shall include an upper horizontal-hinged pump access door. The doors shall be constructed of 14 gauge brushed stainless steel. The compartment doors shall be securely attached with a full-length stainless-steel piano type hinge with 1/4" pins. The hinge shall be "staked" on every other knuckle to prevent the pin from sliding. The doors shall include two (2) push-button style latches to secure the doors in the closed position and two (2) hold-open devices to hold the doors in the open position.		

REQUIREMENT	YES	NO
MISC PUMP PANEL OPTIONS **Pump Panel Tags** Color coded pump panel labels shall be supplied to be in accordance with NFPA 1901 compliance. **Hose Reel Blow-Out Valve** A 1/4" Innovative Controls valve shall be installed between the chassis air system and the hose reel. This valve shall be mounted at the pump operator area. Each 1/4 turn handle grip shall feature built-in color-coding labels and a verbiage tag There shall be a check valve in the air line to prevent water from entering the chassis air system. **PUMP MODULE OPTIONS** **Pump Compartment Heaters** Two (2) 24,000 BTU heaters shall be installed in the lower pump compartment area. The heaters shall be connected to the chassis engine coolant system and shall include 12-volt blowers. The heaters shall be controlled at the pump operator`s panel. **Extreme Weather Heat Pan Extension Plates** The bottom heat pan shall have additional plates mounted inside the front and rear of lower pump module area. These plates shall increase the heat retention in the lower pump module area during extreme weather conditions. The pump compartment heat pan shall have vertical extensions added to the front and rear to further aid in the retention of heat for extreme cold climates. The extensions shall be bolted on and extend up to approximately the bottom of the chassis frame rails. **Heat Pan** The pump compartment shall have a heat pan installed under the pump area. The heat pan shall be constructed of 1/8” (.125”) smooth aluminum plate and shall be easily removable for fair weather operations. The heat pan shall be four (4) sided with two (2) removable bottoms. The bottoms shall provide access to the lower area of the pump/pump compartment. The bottoms shall include butterfly latches to secure them in the closed position.		

REQUIREMENT	YES	NO
Roller Assemblies Stainless steel rollers with nylon guides set in aluminum extrusions shall be installed on the preconnect hose storage area(s). The rollers shall assist with deployment of hose and to protect the module surface. **Flex Joint** The area between the pump modules and body shall include a rubber flex joint. **Module Logos** Logos with the OEM brand name shall be provided and shall be mounted one (1) each side on pump module/pre-connect panels. Logos shall be sized as applicable to available space on panel(s). **Air Horn Switch** A heavy duty weatherproof push-button switch shall be installed at the pump operator`s panel to operate the air horns. The switch shall be labeled ”Evacuation Alert”. Location: top mount control panel. **Storage Pan** A storage pan shall be provided in the upper pump module area. The pan shall be constructed of 3/16” (.188”) aluminum treadplate and be removable to service items in the pump module below. Holes shall be provided in the corners of the pan to facilitate drainage of water. **Single Crosslay Hosebed – 2.5”** One (1) crosslay hosebed shall be provided on the pump module. The crosslay area shall have a capacity for 200' of 2.5" double-jacket fire hose single stacked. The crosslay floor and side walls shall be constructed of 3/16” (.188) smooth aluminum plate. The floor shall be slotted to prevent the accumulation of water and allow for ventilation of wet hose. **Removable Poly Speedlay Tray [Qty: 2]** The speedlay areas shall include removable storage trays. The trays shall be constructed of 1/2" PT2E polypropylene. The floor of the tray shall be slotted to prevent the accumulation of water and allow for ventilation of wet hose. The trays		

REQUIREMENT	YES	NO
shall have vertical slots on each end to facilitate in grabbing the tray during loading and unloading. The hand hold cutouts shall extend approximately 3" beyond the hose bed on each end to facilitate easy removal of the hose tray empty or loaded. The tray shall also have horizontal slots on the upper sides to facilitate in carrying the tray. **WATER TANK** **1030 Gallon Water Tank** A 1030 gallon (US) ”R” booster tank shall be supplied. The booster tank shall be constructed of polypropylene material. The booster tank shall be completely removable without disturbing or dismounting the apparatus body structure. The top of the booster tank is fitted with removable lifting assembly designed to facilitate tank removal. The booster tank top, sides, and bottom shall be constructed of a minimum 1/2” (0.50”) thick black UV-stabilized copolymer polypropylene. Joints and seams shall be fused using nitrogen gas as required and tested for maximum strength and integrity. The tank construction shall include technology wherein a sealant shall be installed between the plastic components prior to being fusion welded. This sealing method will provide a liquid barrier offering leak protection in the event of a weld compromise. The tank cover shall be constructed of 1/2" thick 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 will assist in keeping the covers rigid under fast filling conditions. The tank shall have a combination vent and manual fill tower with a hinged lid. The fill tower shall be constructed of 1/2" polypropylene and shall be a typical dimension of 8" x 8" outer perimeter (subject to change for specific design applications). The fill tower shall be blue in color indicating that it is a water-only fill tower. The tower shall have a 1/4" thick removable polypropylene screen and a polypropylene hinged cover. The capacity of the tank shall be engraved on the top of the fill tower lid. The booster tank shall have two (2) tank plumbing openings. One (1) for a tank-to-pump suction line with an anti-swirl plate, and one (1) for a tank fill line. 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 per the tank fill inlet size.		

REQUIREMENT	YES	NO
The sump shall be constructed of a minimum of 1/2" polypropylene. The sump shall have a minimum 3" N.P.T. threaded outlet 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. The transverse and longitudinal swash partitions shall be manufactured of a minimum of 3/8" 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. 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 an I.D. of 3" or larger that is designed to run through the tank. This outlet shall direct the draining of overflow water past the rear axle, thus reducing the possibility of freeze-up of these components in cold environments. This drain configuration shall also assure that rear axle tire traction shall not be affected when moving forward. The booster tank shall undergo extensive testing prior to installation in the truck. All water 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 tank shall be 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. The tank must be designed 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. 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 will allow the user to connect with the tank manufacturer for additional information and assistance. The tank shall have a limited Lifetime warranty that provides warranty service for the life of the fire apparatus in which the tank is installed. Warranties are transferable if the apparatus ownership changes by requesting the transfer from the tank manufacturer.		

REQUIREMENT	YES	NO
Tank capacity is 1030 US gallon / 857 Imperial gallons / 3898 Liters. **Fill Tower Location** Fill tower(s) shall be located offset to officer side of water tank. **TANK PLUMBING** **Tank Fill, 2.5" Akron Valve** One (1) 2.5" pump-to-tank fill line having a manually operated 2.5" Akron valve. The valve control shall be located at the pump operator`s panel and shall visually indicate the position of the valve at all times. The valve shall be controlled with a chrome handle. The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless-steel ball when in a throttle position with water flowing through it. The valve shall be of the unique Akron swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing. All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss. **Tank Drain, 1.5"** One (1) 1-1/2" gated tank drain shall be installed. It shall be controlled by a manually operated Akron 1-1/2" valve at the left side running board area or under L1 compartment with a running board suction tray, slide-out platform, or a heat pan and shall be controlled at the valve and visually indicate the position of the valve at all times. The valve shall be an Akron 8800HD series with a chrome plated brass ball for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the brass ball when in a throttle position with water flowing through it. The valve shall be of the unique Akron swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.		

REQUIREMENT	YES	NO
All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss. **Tank To Pump** One (1) manually operated 3” Akron valve shall be installed between the pump suction and the booster tank. Includes flex hose with stainless steel hose clamps for connection to the 4" tank sump outlet. The valve control shall be located at the pump operator`s panel and shall visually indicate the position of the valve at all times. The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless-steel ball when in a throttle position and water is flowing through it. The valve shall be of the unique Akron swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing. All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss. A check valve shall be provided in the tank to pump supply line to prevent the possibility of "back filling" the water tank. The valve control shall be located at the pump operator`s panel and shall visually indicate the position of the valve at all times. **Water Tank Fill, 2.5”** One (1) 2.5” (63.5 mm) water tank fill connection shall be provided and mounted in the specified location. The connection shall include an inlet strainer, 2.5” (63.5 mm) FNST chrome inlet swivel and a chrome plug with cable. A 2.5” (63.5 mm) stainless steel pipe and/or high-pressure flexible hose will connect to the water tank. All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss. One 2.5" valve shall be installed between the fill connection port and the tank to prevent water from flowing out of the tank after filling and disconnecting the hose. Location: officer side pump panel.		

REQUIREMENT	YES	NO
FOAM TANK **50 Gallon Foam Cell** A 50-gallon (U.S.) foam cell for Class A foam shall be supplied. The foam cell shall be integral to the water tank. The integral tank top, sides, and bottom shall be constructed of black polypropylene material. Joints and seams shall be fused using nitrogen gas as required and tested for maximum strength and integrity. The tank construction shall include technology wherein a sealant shall be installed between the plastic components prior to being fusion welded. This sealing method will provide a liquid barrier offering leak protection in the event of a weld compromise. The copolymer polypropylene material shall be used for its high strength and corrosion resistance for a prolonged tank life. The foam tank shall have a manual fill tower. The fill tower shall be constructed of 1/2" polypropylene and shall be a typical dimension of 8" x 8" outer perimeter (subject to change for specific design applications). Foam fill tower shall be constructed of a Green colored material indicating type of foam utilized. The capacity of the tank shall be engraved on the top of the fill tower lid. The fill tower shall be located in the forward area of the tank. The tower shall have a 1/4" thick removable polypropylene screen. 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. The foam fill tower shall be removable to facilitate the cleaning of the foam tank. The foam tank shall undergo extensive testing prior to installation in the truck. All foam tanks shall be tested and certified as to capacity. The tank must be designed 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. **LADDER STORAGE / RACKS** **Ladder Brand** The ladder brand capable of being carried on the unit shall be Alco-Lite. **Ladders** The length of ladders capable of being stored shall be the following: 24' 2-section, 14' roof ladder and 10' attic ladder w/shoes.		

REQUIREMENT	YES	NO
Storage Tunnel Contents Storage tunnel capable of holding (1) 2-section, (1) roof, (1) attic, (2) pike poles, (1) backboard in Officer. **HANDRAILS / STEPS** **Slide-Out Platform** The slide-out platform shall be approximately 21” deep and shall be constructed of 1/8” aluminum treadplate. The platform shall be mounted under the apparatus body. The platform shall utilize a maintenance-free slide system incorporating stainless steel shoulder bolts that slide in slotted heavy wall aluminum angles. Notches shall be provided at each end of the slots to hold the platform in both the extended and retracted positions. A chrome grab handle shall be provided on the front face of the platform for ease of operation. Non-slip aluminum hand rail(s) with chrome plated stanchions shall be provided as best suited for use with the platform operation. If applicable, NFPA pump throttle height requirement shall be measured from the top of the slide-out platform on all aerials and from the ground on side mounted pump operator panels on non-aerial apparatus. Location: below driver side pump panel, below officer side pump panel. **Intermediate Pump Panel Steps** Two (2) intermediate pump panel steps shall be provided. Each intermediate step shall be constructed of 3/16” (.187”) aluminum treadplate. The steps shall include a multi-directional, aggressive gripping surface incorporated into the treadplate. The surface shall extend vertically from the diamond plate sheet a minimum of 1/8” (.125”). Gripping surfaces shall be circular in design, a minimum of 1” diameter and on centers not to exceed 4”. The steps shall be bolted onto the pump module and be easily removable for replacement in the case of damage. Lighting shall be provided for illumination of the upper surface of each step.		

REQUIREMENT	YES	NO
Intermediate Rear Step An intermediate step shall be provided on the rear of the apparatus. The step shall be constructed of 3/16" (.187") aluminum treadplate. The step shall include a multi-directional, aggressive gripping surface incorporated into the treadplate. The step shall be bolted to the rear end assembly and be easily removable for replacement in the case of damage. One (1) handrail shall be installed in compliance with current NFPA. The handrails shall be constructed of 6063T5 1.25" OD anodized aluminum tube, with an integral ribbed surface to assure a good grip for personnel safety, mounted between chrome stanchions. **Access Ladder – Alco Lite** The SURE-STEP-II is a durable, operator-friendly ladder that provides safe access to the top of any apparatus. The ladder stores in a low-profile position parallel to the truck body. To use, the bottom section simply flips down, rotating the ladder to a comfortable ten degree climbing angle. When finished, the bottom section flips up causing the ladder to return to a vertical stored position. The cam-action design locks the ladder in both the working and stored position, providing a simple one hand operation. **Sure-Step II Features** - Pull out and down on the flower flip-up section to rotate ladder from stored to a safe ten (10) degree working position. - The cam-action design locks the ladder in both the working and stored position for easy, one-step operation. - When finished swing the step up as the ladder retracts to a vertical stored position. - The cam-action design allows the ladder to remain vertical without vibration or rattles. - Heavy-duty stainless steel stanchions - Stainless steel hardware - Heavy-duty mounting brackets - Cast aluminum, slip resistant tread - Non-slip handrail - Cam-action pivoting design - Heavy-duty gas struts - Durable aluminum construction The width of this ladder does not change. The length will change according to the dimensions needed regarding the respective apparatus. The step is 3 3/4" deep, 12" wide, and is a cast aluminum.		

REQUIREMENT	YES	NO
The ladder shall be positioned at the rear of body driver side. This position shall not block and/or obstruct rearward facing DOT and/or NFPA lighting. (**Lighting being blocked directly from the rear of the apparatus shall not be acceptable.**) **Folding Steps [Qty: 4]** Innovative Controls dual lighted LED folding step(s) shall be located officer side front compartment face, driver side front compartment face. The folding step(s) shall meet current NFPA in step height and surface area. Innovative Controls dual lighted LED folding step with LED lights integral to the step on the top to provide NFPA requirements of 2 fc (20 lx) on the stepping surface. Folding step shall also have a LED light integral to the bottom of the step to meet NFPA requirements of a stepping surface up to 18” below the step. The folding step shall sustain a minimum static load of 500 lb with a 3 to 1 safety factor. The folding step shall also meet NFPA slip resistance qualifications. Corrosion resistance shall be demonstrated by a 1000 hr salt spray test with no visible signs of deterioration of the step body or hardware. One (1) hand rail shall be installed in compliance with current NFPA. The hand rail shall be constructed of 6063T5 1.25” OD anodized aluminum tube, with an integral ribbed surface to assure a good grip for personnel safety, mounted between chrome stanchions. **MISC BODY OPTIONS** **Mud Flaps** Black mud flaps shall be provided for the body wheel wells. **Body Mainframe** The body mainframe shall be entirely constructed of aluminum. The complete framework shall be constructed of 6061T6 and 6063T5 aluminum alloy extrusions welded together using 5356 aluminum alloy welding wire. The body mainframe shall include 3” x 3” 6061-T6 aluminum 3/8” (0.375”) wall crossmember extrusion or 3" x 3" I-beam section aluminum extrusion depending on the application at the front of the body . A solid 3” x 3” ”I-beam” section aluminum extrusion shall be provided the full width of the body forward and rearward of the rear wheel well. The crossmembers shall be designed to support the compartment framing and shall be welded to 1-3/16” x 3” (1.188” x 3”) solid 6063-T5 aluminum frame sill extrusions. The frame sill extrusions shall be shaped to contour with the chassis frame rails and shall be protected from contact with the		

REQUIREMENT	YES	NO
chassis frame rails by 5/16” x 2” (0.31” x 2”) fiber-reinforced rubber strips to prevent wear and galvanic corrosion caused when dissimilar metals come in contact. **Body Mounting System** The main body shall be attached to the chassis frame rails with six (6) of 5/8” (0.625”) diameter steel U-bolts. This body mounting system shall be used to allow easy removal of the body for major repair or disassembly. **Water Tank Mounting System** The body design shall allow the booster tank to be completely removable without disturbing or dismounting the apparatus body structure. The water tank shall rest on top of a 3” x 3” frame assembly covered with rubber shock pads and corner braces formed from 3/16” angled plate to support the tank. The booster tank mounting system shall utilize a floating design to reduce stress from road travel and vibration. To maintain low vehicle center of gravity the water tank bottom shall be mounted within 5” of the frame rail top. **Hosebed Side Assembly** The hosebed side assemblies shall be made of 3” x 3” slotted aluminum extrusion and 3/16” (.188”) smooth plate. The hosebed side assemblies shall provide a 95” high body. The exterior hosebed side surface shall be completely sanded and deburred to assure a smooth finish and painted job color. The interior hosebed side surface shall be completely sanded and deburred to assure a smooth sanded finish. **Hose Bed** The area above the booster tank shall have a hose storage area provided. The hose bed shall be constructed entirely from maintenance-free, 3/4” deep x 7.5” wide, extruded aluminum slats that shall be pop-riveted into a one-piece grid system. Each slat shall have all sharp edges removed and have an anodized ribbed top surface that shall prevent the accumulation of water and allow for ventilation of wet hose. The hose bed design shall incorporate adjustable tracks in the forward area and the rearward area of the hose bed for the installation of an adjustable divider(s). The adjustable tracks shall hold an adjustable divider(s) mounting nut straight, so only a Philips head screwdriver is required to adjust a divider(s) from side to side (as is practical with other hose bed mounted equipment).		

REQUIREMENT	YES	NO
The hose bed shall be easily removable to allow access to the booster tank below. **Hose Bed Divider [Qty: 2]** There shall be a hose bed divider provided the full fore-aft length of the hose bed. The hose bed divider shall be constructed of 1/4" (0.25") smooth aluminum plate with an extruded aluminum base welded to the bottom. The rear end of the divider shall have a 3" radius corner to protect personnel. The divider shall be natural finish aluminum for long-lasting appearance and shall be sanded and de-burred to prevent damage to the hose. The divider shall be adjustable from side to side in the hose bed to accommodate varying hose loads. **Storage Pan** A storage pan shall be provided in the forward area of the hose bed. The storage pan shall be constructed of 3/16" (.188") aluminum tread plate. **Hose Bed Divider Hand Hold** There shall be a hand hole cut-out(s) on the trailing edge of each hose bed divider. The cut-out(s) is specifically sized for use in adjusting of the hose bed divider. **Fuel Fill** A recessed fuel fill shall be provided at the driver side rear wheel well area. **Fill Tower Location** The fill tower(s) shall be located inside the hose bed storage pan as applicable. **Body Wheel Well** The body wheel well frame shall be constructed from 6063-T5 aluminum extrusion with a slot the full length to permit an internal fit of 3/16" (0.188") aluminum smooth plate painted job color. The wheel well trim shall be constructed from 6063-T5 formed aluminum extrusion. The wheel well liners shall be constructed of a 3/16" (.187") composite material. The liners shall be bolt-on and shall provide a maintenance-free and damage-resistant surface.		

REQUIREMENT	YES	NO
Rub Rail The pump area module(s) and body shall have rub rails mounted along the sides and at the rear. The rub rail shall be C-channel in design and constructed of 3/16” thick 6463T6 anodized aluminum extrusion. The rub rail shall be 2.75” high x 1.25” deep and shall extend beyond the body width to protect compartment doors and the body side. The rub rail depth shall allow marker and/or warning lights to be recessed inside for protection. The top surface of the rub rail shall have minimum of five (5) raised serrations. Each serration being a minimum of .1” in height and with cross grooves to provide a slip-resistant edge for the tailboard step and pump module running board areas. The rub rail shall be mounted a minimum of 3/16” off the pump module and body with nylon spacers. The ends of each section shall be provided with a finished rounded corner piece. **Anodize Aluminum Trim** A anodize aluminum trim shall be located at the bottom edge of all body compartment openings including pump enclosure with painted edge (as applicable). The trim shall provide added protection of the painted surface of the body when equipment is removed from the compartment. **Angled Tailboard Corners** The corners of the rear tailboard shall be angled inward for increased clearance around the rear of the apparatus. **Wheel Chocks** Zico Model #SAC-44 Chocks for up to a 44” diameter tires shall be supplied and located below compartment L1. The SQCH-44-H horizontal holder and pair of chocks require a minimum storage area of 6” high, 10-1/2” wide and 22-3/8” deep. **Seamless Overlays** The outboard panels of the roof top compartment or full width hose bed as applicable to be smooth plate overlays. These areas are to be seamless and painted job color.		

REQUIREMENT	YES	NO
SCBA BOTTLE STORAGE **SCBA Strap** Straps shall be provided in each exterior storage compartment to provide secondary means to hold each SCBA bottle in the compartment. The straps shall be constructed from 1" nylon webbing formed in a loop. The strap(s) shall be mounted to the storage compartment ceiling directly inside the door opening at each bottle location. **SCBA 1 BOTTLE STORAGE – Driver Rearward** One (1) SCBA bottle storage constructed with aluminum plate with hinged door and push button latch shall be provided in the body wheel well area. The door shall match wheel well area material and finish. The door shall cover the recessed fuel fill if located in the wheel well adjacent to the SCBA storage. U-shaped trough made out of aluminum smooth plate with rubbert insert shall be provided to store SCBA bottles. Location: driver side rear wheel well offset rearward **SCBA 3 BOTTLE STORAGE – Driver Forward / Officer Forward / Officer Rearward** Three (3) SCBA bottle storage constructed with aluminum plate with hinged door and push button latch shall be provided in the body wheel well area. The door shall match wheel well area material and finish. The door shall cover the recessed fuel fill if located adjacent to the SCBA storage. U-shaped troughs made out of aluminum smooth plate with rubbert inserts shall be provided to store standard size SCBA bottles up to 6.75" in diameter and 24.5" in length. The upper two troughs can also store a standard size 20lbs ABC Extinguisher or 2.5 gal Water Extinguisher in each trough. Location: driver side rear wheel well offset forward, officer side rear wheel well offset forward, officer side rear wheel well offset rearward		

REQUIREMENT	YES	NO
PUMPS **Pump Rating 7000 LPM** The pump shall be rated at 7000 LPM. **Fire Pump System – Hale QMAX** The pump shall be a midship-mounted Hale QMAX single stage centrifugal pump. The pump shall be mounted on the chassis frame rails of commercial or custom truck chassis and have the capacity of 1,250 to 2,250 gallons per minute (U.S. GPM) NFPA 1901 rated performance, and shall be split-shaft driven from the truck transmission. The entire pump body and related parts shall be of fine grain alloy cast iron, with a minimum tensile strength of 30,000 psi (207 MPa). All metal moving parts in contact with water shall be of high quality bronze or stainless steel. Pump body shall be horizontally split in two sections, for easy removal of impeller assembly including wear rings and bearings from beneath the pump without disturbing pump mounting or piping. The pump impeller shall be hard, fine grain bronze of the mixed flow design and shall be individually ground and hand balanced. Impeller clearance rings shall be bronze, easily renewable without replacing impeller or pump volute body, and of wrap-around double labyrinth design for maximum efficiency. The pump shaft shall be heat-treated, corrosion-resistant stainless steel and shall be rigidly supported by three (3) bearings for minimum deflection. 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 shall be splash-lubricated. Pump shaft must be sealed with double-lip oil seal to keep road dirt and water out of the gearbox. Two (2) 6” diameter suction ports with 6” NST male threads and removable screens shall be provided, one each side. The ports shall be mounted one (1) on each side of the midship pump and shall extend through the side pump panels. Inlets shall come equipped with long handle chrome caps. **Discharge Manifold** The pump system shall utilize a stainless steel discharge manifold system that allows a direct flow of water to discharge valves. The manifold and fabricated piping systems shall be constructed of a minimum of Schedule 10 stainless steel to reduce corrosion.		

REQUIREMENT	YES	NO
Pump Shift The pump shift shall be pneumatically-controlled using a power shifting cylinder. The power shift control valve shall be mounted in the cab and be labeled ”PUMP SHIFT”. The apparatus transmission shift control shall be furnished with a positive lever, preventing accidental shifting of the chassis transmission. A green indicator light shall be located in the cab and be labeled ”PUMP ENGAGED”. The light shall not activate until the pump shift has completed its full travel into pump engagement position. A second green indicator light shall be located in the cab and be labeled ”OK TO PUMP”. This light shall be energized when both the pump shift has been completed and the chassis automatic transmission has obtained converter lock-up (4th gear lock-up). **Test Ports** Two (2) test plugs shall be pump panel mounted for third party testing of vacuum and pressures of the pump. **Gearbox Cooler** A gearbox cooler shall be provided to maintain safe operating temperatures during prolonged pumping operations for pump rating 1500 GPM and over. **PUMP OPTIONS** **Steamers, Flush+1** The pump 6" steamer intake(s) shall be mounted approximately 1” from the pump panel to back of cap when installed. The "Flush+1" dimension can vary + or - 1-1/4" or as practicable depending on the pump module width and options selected. (Example 72" or 76" modules.) Location: driver's side, officer's side. **Zinc Anodes** The zinc anodes help prevent damage caused by galvanic corrosion within the fire pump. The system provides a sacrificial metal which helps to diminish or prevent pump and pump shaft galvanic corrosion. One anode will be located on the suction side and one will be located on the discharge side of the pump.		

REQUIREMENT	YES	NO
Manual Pump Shift Override One (1) manual pump shift override shall be side panel mounted to engage the pump in the event of an air pressure failure. The pump shift shall be operated by a chrome handled push-pull cable. **Master Inlet Valve – Driver and Officer Side** A Hale Master Intake Valve (MIV-E) shall be provided for the specified intake. The large diameter inlet valve shall be capable of achieving an NFPA test rating of 1500 GPM through a single 6” suction hose. The inlet valve shall be operated by a 12 VDC electric motor with a remote switch provided at the pump operator`s position. The 12 VDC motor shall be provided with an automatic resetting, thermally-compensated over-current protection circuit breaker to protect the 12 VDC motor and apparatus electrical system. The gear actuator on the valve will cycle from full closed to full open in not less than three (3) seconds. A hand-controlled pump panel mounted manual override (knob style) shall be provided. An indicator light panel shall be located at the pump operator`s position to show valve open, closed, or traversing from open to closed. A built-in adjustable pressure relief valve shall be provided. The pressure relief valve shall be factory set to 125 psi. The pressure relief valve shall provide overpressure protection for the suction hose even when the intake valve is closed. A 3/4” air bleeder valve shall be provided and controlled at the pump operator`s position.  A 1/4” water bleeder shall be supplied and controlled at the pump operator`s position. Location: • driver side pump panel • officer side pump panel. **Mechanical Pump Seal** The midship pump shall be equipped with a high quality, spring loaded, 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.		

REQUIREMENT	YES	NO
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 back-up 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. **Master Drain, Air Operated** An air operated master drain valve shall be installed and operated from the pump operator`s panel. The master pump drain assembly shall consist of a Class 1 bronze master drain with a rubber disc seal and air switch. The air master drain valve shall have six (6) individually-sealed ports that allow quick and simultaneous draining of multiple intake and discharge lines. It shall be constructed of corrosion-resistant material and be capable of operating at a pressure of up to 600 PSI. The master drain shall provide independent ports for low point drainage of the fire pump and auxiliary devices. **Additional Hale Primer – Driver and Officer Intakes** An additional primer valve shall be provided and installed on the officer side before master intake valve, driver side before master intake valve and controlled at the pump operator`s panel. One (1) priming control shall open the priming valve in conjunction with the priming valve that comes with the pump and start the priming motor. The priming valve shall be electronically interlocked to the ”Park Brake” circuit to allow priming of the pump before the pump is placed in gear. If plumbed to front or rear intakes the connection shall be at the highest point of the piping. **Pump Cooler** The pump shall have a 3/8” line installed from the pump discharge to the booster tank to allow a small amount of water to circulate through the pump casing in order to cool the pump during sustained periods of pump operation when water is not being discharged. The pump cooler line shall be controlled from the pump operator`s panel by a Innovative Controls 1/4 turn valve with "T" handle. Each 1/4 turn handle grip shall feature built-in color-coding labels and a verbiage tag		

REQUIREMENT	YES	NO
Auxiliary Engine Cooler Control The auxiliary engine cooler shall be controlled from the pump operator`s panel by an Innovative Controls 1/4 turn valve with "T" handle. The 1/4 turn handle grip shall feature built-in color-coding label and a verbiage tag. 1/2” lines shall be installed from the pump discharge via the valve to the cooler and back to the pump intake to allow a small amount of water to circulate through the engine cooler. **Priming System** An electrically-driven Hale ESP priming pump shall be provided for the water pump. The primer shall be positive displacement rotary vane type that requires no lubricant. The primer motor shall be heat-treated, anodized aluminum specially coated for wear and corrosion resistance. One (1) priming control, located at the pump operator`s position, shall open the priming valve and start the priming motor. The priming valve shall be electronically interlocked to the ”Park Brake” circuit to allow priming of the pump before the pump is placed in gear. **Thread Type Nova Scotia 3.234 ODM x 5 TPI Threads** *All 2.5" inlets and discharges to include (**Nova Scotia 3.234 ODM x 5 TPI threads**) threads as an integral part of the valve. Integral to valve threads are preferred over screw on adapters. All 1.5” discharges shall be NPSH threads.* **INTAKES** **Intake 2.5” Top Mount Control Akron Valve** One (1) 2-1/2” suction inlet with a manually operated 2-1/2” Akron valve shall be provided on the driver side pump panel, officer side pump panel. The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless-steel ball when in a throttle position and water is flowing through it. The valve shall be of the unique Akron swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.		

REQUIREMENT	YES	NO
The outlet of the valve shall be connected to the suction side of the pump with the valve body located behind the pump panel. The valve shall come equipped with a brass inlet strainer, 2-1/2" NST female chrome inlet swivel and shall be equipped with a chrome plated rockerlug plug with a retainer device. The valve shall be controlled by a vertically mounted quarter turn locking handle located on the top mounted pump operator`s panel and shall visibly indicate the position of the valve at all times. All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance, and decreased friction loss. A 3/4" bleeder valve assembly will be installed on the side pump panel. **Intake and Discharge Controls** All intake and discharge controls that are not electric shall include aircraft cable style connections. Rigid rods will not be accepted. **DISCHARGES AND PRECONNECTS** **Front Jump Line 1.5" Akron Valve** One (1) 1-1/2" preconnect outlet with a manually operated Akron valve shall be supplied to the extended front bumper. The preconnect shall consist of a 2" heavy duty hose coming from the pump discharge manifold to a 2" FNPT x 1-1/2" MNST mechanical swivel hose connection to permit the use of the hose from either side of the apparatus. The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless-steel ball when in a throttle position with water flowing through it. The valve shall be of the unique Akron swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing. An air blow-out valve shall be installed between the chassis air reservoir and the front jump line. The control shall be installed on the pump operator`s panel. The discharge shall be supplied with a Class 1 automatic 3/4" drain valve assembly. The automatic drain shall have an all-brass body with stainless steel check assembly. The drain shall normally be open and automatically close when the pressure is greater than 6 psi.		

REQUIREMENT	YES	NO
The valve control shall be located at the pump operator panel and shall visually indicate the position of the valve at all times. All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss. **Deck Gun 3" Discharge Akron Valve** One (1) 3” deck gun discharge outlet with a manually operated Akron valve and 3” stainless steel pipe shall be provided above the pump compartment. The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless-steel ball when in a throttle position with water flowing through it. The valve shall be of the unique Akron swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing. The valve shall be equipped with a device that limits the opening and closing speeds to comply with the current edition of NFPA 1901. The valve control shall be located at the pump operator`s panel and shall visually indicate the position of the valve at all times. All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss. **Front Bumper Discharge Swivel, Brass In Tray** There shall be a brass swivel provided for the front bumper discharge located in hose tray center front bumper on lower back wall. **Double Speed Lay 1.5” Akron Valve Controls** One (1) double speed lay discharge shall be provided. Each speed lay section shall include one (1) 2” brass swivel with a 1-1/2” hose connection to permit the use of the hose from either side of the apparatus. The speed lay piping shall consist of two (2) 2” heavy duty hoses coming from the pump discharge manifold to the 2” swivel. The discharges shall include a manually operated Akron valve. The 2" valves shall be Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The		

REQUIREMENT	YES	NO
valves shall have a self-locking ball feature using an automatic friction lock design to balance the stainless-steel ball when in a throttle position with water flowing through it. The valves shall be of the unique Akron swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing. The valve controls shall be located at the pump operator`s panel and shall visually indicate the position of the valves at all times. All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss. **Left Panel 2.5" Discharge Akron Valve** One (1) 2-1/2" discharge outlet with a manually operated Akron valve shall be provided at the left hand side pump panel. The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position with water flowing through it. The valve shall be of the unique Akron swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing. The valve control shall be located at the pump operator panel and shall visually indicate the position of the valve at all times. All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss. Location: left side discharge 2. **Right Panel 2.5" Discharge Akron Valve** One (1) 2-1/2" discharge outlet with a manually operated Akron valve shall be provided at the right side pump panel. The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless-steel ball when in a throttle position with water flowing through it.		

REQUIREMENT	YES	NO
The valve shall be of the unique Akron swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing. The valve control shall be located at the pump operator panel and shall visually indicate the position of the valve at all times. All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss. Location: right side discharge 2. **Left Rear 2.5" Discharge Akron Valve** One (1) 2-1/2” discharge outlet with a manually operated Akron valve shall be supplied to the left rear of the apparatus by a 2-1/2” stainless steel pipe. The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position with water flowing through it. The valve shall be of the unique Akron swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing. The valve control shall be located at the pump operator panel and shall visually indicate the position of the valve at all times. All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss. Location: left rear discharge. **2.5” Single Crosslay Akron Valve** One (1) single crosslay discharge shall be provided. The crosslay section shall included one (1) 2.5” piping with a 2-1/2” hose connection. The piping shall consist of one (1) 2.5” heavy-duty hoses coming from the pump discharge manifold to the 2-1/2" hose connection. The discharge shall include a manually-operated Akron valve. The valves shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valves shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position with water flowing through it.		

REQUIREMENT	YES	NO
The valves shall be of the unique Akron Swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing. The valve controls shall be located at the pump operator`s panel and shall visually indicate the position of the valve at all times. **All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.4" Panel Discharge Electric Akron** **4" Pump Panel Discharges – Driver and Officer** One (1) 4" panel discharge with an Akron electric actuated valve shall be provided. The valve shall be 4" Akron 8800HD series with bronze flat ball and polymer seals for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the brass ball when in a throttle position with water flowing. The valve shall be of the unique Akron Swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing. The end of the discharge outlet shall be equipped with a chrome-plated, rocker-lug cap with a retainer. The valve shall utilize an electric driven worm gear actuator. The valve may also be operated manually in case of electrical system failure. All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss. Location: left side discharge 1, right side discharge 1. **Deck Gun Location** Deck gun piping shall be positioned centered in deck gun channel. This location shall allow for optimal operation of a deck gun monitor once installed. **DISCHARGE OPTIONS** **Akron Apollo Hi-Riser Monitor** The monitor shall be a fixed Akron Apollo 3433 direct mount monitor with handwheel elevation control from 90° above to 45° below horizontal. It shall have an elevation safety stop 35° above horizontal. It shall permit 360° continuous rotation in the deck mode flowing 1250 GPM and a full 3" waterway with cast-in turning vanes in each elbow and a 3" direct mount flange. While in the deck mode, the unit must have the ability to pivot to a position 24" above the base of the		

REQUIREMENT	YES	NO
flange. The monitor shall also include a pressure gauge, carry handle, grease fittings. *All 2.5" inlets and discharges to include (**Nova Scotia 3.234 ODM x 5 TPI threads**) threads as an integral part of the valve. Integral to valve threads are preferred over screw on adapters. All 1.5" discharges shall be NPSH threads.* **Nozzle Akron 5160 Akromatic 1250 Master Stream Nozzle** The monitor nozzle shall be an Akron Akromatic 5160 master stream nozzle with the following characteristics. • Built-in stream shaper • Pyrolite Nozzle • Manual Pattern Control • 250-1250 gpm flow **Akron Electric Valve 9333 Controller For 4" Discharges** An Akron Brass Style 9333 Valve Controller shall be provided with a five-year manufacturer warranty. The display shall be a full color LCD display with a backlight and manual adjustment of the brightness as well as an auto-dimming option. The electric controls shall provide true position feedback, requiring no clutches in the motor or current limiting. The unit shall be sealed with momentary open, close as well as an optional one touch full open feature to operate the actuator. The controller will provide an LCD display showing valve position indication and have up to three preset locations that can be user set and easily recalled upon each use. Valve position indication will be determined from true position feedback and indicate the exact position of the valve. Two additional buttons shall be available to be used for preset selection, preset activation and menu navigation. Locate on pump operator panel to control left side 4" discharge 1, right side 4" discharge 1. **Bleeder Drain Valve [Qty: 11]** The bleeder/drain valves shall be Innovative Controls ¾" ball brass drain valves with a chrome-plated 1/4 turn handle. Each 1/4 turn handle grip shall feature built-in color-coding labels and a verbiage tag identifying each valve.		

REQUIREMENT	YES	NO
Top Mount Valve Control [Qty: 12] For valve actuation, the apparatus pump panel shall be equipped with Innovative Controls Pistol Grip Pivot-Lock Top (or Side) Mount Valve Controls. The ergonomically designed pistol grip handle shall be chrome-plated zinc with recessed UV-resistant labels for color-coding and verbiage. The pivot-to-move, auto-locking handle and control rod assembly shall open and close valves when the user simply moves the rod. To eliminate valve drift, the control shall lock the valve control at the desired position by simply releasing the handle when the desired pressure is reached A robust die cast and chrome-plated pivot arm shall house the internal brass brake shoe protecting it from environmental hazards. Two bronze bushings and brass pivot rod shall ensure long-term smooth valve control operation and never require lubrication. The valve control handles shall mount to a robust but decorative chrome-plated diecast zinc bezel designed to install directly onto/into the apparatus as a complete sub-assembly. The bezel shall have recessed UV-resistant labels for color-coding and verbiage. **Garnish Ring Bezel** Innovative Controls intake and/or discharge garnish rings shall be installed to the apparatus with mounting bolts. These bezel assemblies will be used to identify intake and/or discharge ports with color and verbiage. These garnish rings are designed and manufactured to withstand the specified apparatus service environment and shall be backed by a warranty equal to that of the exterior paint and finish. The specified assemblies feature a chrome-plated panel-mount bezel with durable UV resistant polycarbonate inserts. These UV resistant polycarbonate graphic inserts shall be sub-surface screen printed to eliminate the possibility of wear and protect the inks from fading. All insert labels shall be backed with 3M permanent adhesive (200MP), which meets UL969 and NFPA standards. **BOOSTER REEL** **Booster Hose Reel** A Hannay booster reel shall be provided and located in the rear body compartment. The booster reel shall be constructed utilizing an all aluminum welded base. Reel bushings shall be manufactured from Nylatron to ensure maintenance-free operation. A 12 volt electrical motor shall be provided and will rewind the reel with a chain and sprocket drive mechanism. All electrical switch connections shall be		

REQUIREMENT	YES	NO
coated to protect against moisture. The booster reel shall have a capacity for up to 200` of 1” booster hose.  Plumbing to the reel shall be a 1-1/2” flexible line with the discharge control located at the operator`s control panel. All fabricated piping shall be constructed of a minimum of Schedule 10 stainless steel pipe to reduce corrosion of the lines. **Rollers** A booster reel roller assembly shall be provided. The drop-down roller assembly shall include chrome guides with nylon bushings shall be mounted around the booster reel in the rear compartment. For use with rear compartment mounted booster reel. To extend outward when deployed to route and guide hose past rescue style ladder mounted to rear of body. **PRESSURE GOVERNORS** **FRC TGA400 Governor** Fire Research InControl series TGA400-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 5-1/2" high by 10-1/2" wide by 2" deep. The control knob shall be 2" in diameter with no mechanical stops, have a serrated grip, and a red idle push button in the center. It shall not extend more than 1-3/4" from the front of the control module. Inputs for monitored information shall be from a J1939 databus or independent sensors. Outputs for engine control shall be on the J1939 databus or engine specific wiring. The following continuous displays shall be provided: • Pump discharge; shown with four daylight bright LED digits more than 1/2" high • Pump Intake; shown with four daylight bright LED digits more than 1/2" high • Pressure / RPM setting; shown on a dot matrix message display • Pressure and RPM operating mode LEDs • Throttle ready LED • Engine RPM; shown with four daylight bright LED digits more than 1/2" high • Check engine and stop engine warning LEDs		

REQUIREMENT	YES	NO
• Oil pressure; shown on a dual color (green/red) LED bar graph display • Engine coolant temperature; shown on a dual color (green/red) LED bar graph display • Transmission Temperature: shown on a dual color (green/red) LED bar graph display • Battery voltage; shown on a dual color (green/red) LED bar graph display. The dot-matrix message display shall show diagnostic and warning messages as they occur. It shall show monitored apparatus information, stored data, and program options when selected by the operator. All LED intensity shall be automatically adjusted for day and night time operation. The program shall store the accumulated operating hours for the pump and engine to be displayed with the push of a button. It shall monitor inputs and support audible and visual warning alarms for the following conditions: • High Battery Voltage • Low Battery Voltage (Engine Off) • Low Battery Voltage (Engine Running) • High Transmission Temperature • Low Engine Oil Pressure • High Engine Coolant Temperature • Out of Water (visual alarm only) • No Engine Response (visual alarm only). The program features shall be accessed via push buttons and a control knob located on the front of the control panel. There shall be a USB port located at the rear of the control module to upload future firmware enhancements. Inputs to the control panel from the pump discharge and intake pressure sensors shall be electrical. The discharge pressure display shall show pressures from 0 to 600 PSI. The intake pressure display shall show pressures from -30 in. Hg to 600 PSI. The governor shall operate in two control modes, pressure and RPM. No discharge pressure or engine RPM variation shall occur when switching between modes. A throttle ready LED shall light when the interlock signal is recognized. The governor shall start in pressure mode and set the engine RPM to idle. In pressure mode the governor shall automatically regulate the discharge pressure at the level set by the operator. In RPM mode the governor shall maintain the engine RPM at the level set by the operator except in the event of a discharge pressure increase. The governor shall limit a discharge pressure increase in RPM mode to a maximum of 30 PSI. Other safety features shall include recognition of no water conditions with an automatic programmed response and a push-button to return the engine to idle.		

REQUIREMENT	YES	NO
The pressure governor, monitoring and master pressure display shall be programmed to interface with a specific engine. Location of the governor and monitoring display shall be: Pump Operator`s Panel.  **GAUGES**  **GAUGE IC 10 LED FOAM TANK LEVEL**  One (1) Innovative Controls brand foam tank level gauge shall be located at the pump operator`s panel to provide a high-visibility display of the foam tank level. Ten (10) high-intensity light emitting diodes (LEDs) on the display module shall have a 3-dimensional lens allowing the full, 3/4, 1/2, 1/4, and refill levels to be easily distinguished at a glance within full 180 degree visibility. The display module shall be protected from vibration and contamination with the components being encased in an encapsulated plastic housing. The long life and extreme durability of LED indicators eliminates light bulb replacement and maintenance. Color coded cover plates shall complete the assembly of the display module to the pump panel. Each display level can be set independently for maximum reliability. The display shall provide a steady indication of fluid level despite sloshing inside of the tank when the vehicle is in motion due to an ”anti-slosh” feature. **GAUGE IC 10 LED TANK LEVEL WATER, ADDITIONAL** An additional Innovative Controls brand water tank level gauge shall be located at the officer rear to provide a high-visibility display of the water tank water level. Ten (10) high-intensity light emitting diodes (LED`s) on the display module shall have a 3-dimensional lens allowing the full, 3/4, 1/2, 1/4, and refill levels to be easily distinguished at a glance within full 180-degree visibility. The display module shall be protected from vibration and contamination with the components being encased in an encapsulated plastic housing. The long life and extreme durability of LED indicators eliminates light bulb replacement and maintenance. Color coded cover plates shall complete the assembly of the display module to the pump panel. Each display level can be set independently for maximum reliability. The display shall provide a steady indication of fluid level despite sloshing inside of the tank when the vehicle is in motion due to an ”anti-slosh” feature.		

REQUIREMENT	YES	NO
2.5" Discharge Pressure Gauge (Dual Read) [Qty: 11] The valve discharge gauges shall be 2 ½“ (63mm) diameter Innovative Controls pressure gauges. Each gauge shall have a rugged corrosion free stainless-steel case and clear scratch resistant molded crystals with captive O-ring seals to ensure distortion free viewing and seal the gauge. The gauges shall be filled with a synthetic mixture to dampen shock and vibration, lubricate the internal mechanisms, prevent lens condensation and ensure proper operation from –40F to +160F. Each gauge shall exceed ANSI B40.1 Grade A requirements with an accuracy of +/- 1.5% full scale and include a size appropriate phosphorous bronze bourdon tube with a reinforced lap joint and large tube base to increase the tube life and gauge accuracy. A polished chrome-plated stainless-steel bezel shall be provided to prevent corrosion and protect the lens and gauge case. The gauges shall be installed into decorative chrome-plated mounting bezels that incorporate valve-identifying verbiage and/or color labels. The gauges shall display a range from 0-2750KPA/0-400PSI with black graphics on a white background. **GAUGE IC 10 LED TANK LEVEL WATER/PS2TANK** One (1) Innovative Controls brand water tank level gauge shall be located at the pump operator`s panel to provide a high-visibility display of the water tank level. Ten (10) high-intensity light emitting diodes (LEDs) on the display module shall have a 3-dimensional lens allowing the full, 3/4, 1/2, 1/4, and refill levels to be easily distinguished at a glance within full 180-degree visibility. The display module shall be protected from vibration and contamination with the components being encased in an encapsulated plastic housing. The long life and extreme durability of LED indicators eliminates light bulb replacement and maintenance. Color coded cover plates shall complete the assembly of the display module to the pump panel. System calibration shall be accomplished via supplied magnet. Each display level can be set independently for maximum reliability. The display shall provide a steady indication of fluid level despite sloshing inside of the tank when the vehicle is in motion due to an ”anti-slosh” feature. In addition to the pump panel mounted lights there shall be one (1) Whelen PSTank2 series LED (Light Emitting Diode) strip light installed each side as specified. The system shall be controlled by an Innovative Control tank level driver module that is integral of the NFPA required pump panel mounted tank level light assembly.		

REQUIREMENT	YES	NO
The additional tank level system shall be interlocked through the parking brake assembly so as not to be on while the vehicle is in motion. The remote strip light shall be arranged as follows: Full Green 3/4 Blue 1/2 Amber 1/4 Red Location of Whelen PSTank2 Strip Lights: each side of pump module up high. **FOAM SYSTEMS** **Foam System** A Class 1 SmartFoam 5.0, 12-volt DC powered variable-speed electronic direct-injection foam-concentrate proportioning system with a 5.0 gpm foam concentrate pump shall be integrated into the apparatus to provide foam proportioning. A paddlewheel type flowmeter with a stainless-steel impeller wheel shall monitor waterflow in foam capable discharges. 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 will be provided through the cable set from the control unit. Flowmeters shall have saddle clamp mounting shall be used to mount in stainless steel, brass or iron OEM manifold assembles. The flowmeter selected shall be sized to adequately monitor the minimum and maximum flow expected in the foam capable discharges. The foam proportioning system shall be equipped with a panel mounted digital display control unit with a microprocessor that monitors total water flow and foam concentrate pump output to provide the operator preset proportional amount of foam concentrate injected on the discharge side of the fire pump. Total foam concentrate pump concentrate output shall be 5.0 gallons per minute. Proportioning rate is push-button set by the pump operator on the digital display from 0.1% to 1%, in 0.1% increments. The foam system shall be equipped with a Class1 UltraView SmartFOAM Controller. The SmartFOAM Controller will show the water flow per minute, foam percentage, total water flowed, and total foam flowed on the main screen without having to press any buttons.		

REQUIREMENT	YES	NO
The SmartFOAM Controller will maintain a running total of the amount of water and foam used during the current power cycle. The SmartFOAM Controller shall provide on-screen tutorials to assist the user during calibration. The SmartFOAM Controller will allow push-button modification of the foam proportioning rate from 0.1% to 10.0% in 0.1% increments. The Controller will always begin operation at the preset foam proportioning rate which is configured with a password protected set-up screen. The foam concentrate pump shall be fed concentrate by a non-metallic housing foam concentrate strainer that is equipped with a service shut-off valve. The unit will be fed 12-volt DC power from the apparatus electrical system, and be equipped with a chassis frame ground strap, per the foam proportioner manufacturer`s installation and operating instruction manual. **FOAM SYSTEM OPTIONS** **Foam System Plumbing** The specified foam system shall be plumbed to: • left rear discharge • 2.5” crosslay • 1.5” first speedlay • 1.5” second speedlay • center bumper front jump line • booster reel B1 compartment. **Hale EZ-Fill Foam Tank Refill System** A Hale EZ-Fill foam pump shall be provided. The system shall include a 12 volt, self-priming pump that shall fill at up to 5 GPM for a single cell. The system shall be controlled by a control panel that shall feature smart-switch technology for easy "Fill/Flush/Fill" functions. A cam-lock quick-connect port shall be provided on the pump panel as applicable and shall connect with a clear wand suction hose for use with 5-gallon pail drafting operations. The suction hose shall be stored as required on the unit by the department and shall be equipped with integral strainer to prevent intake of unwanted debris. The control and quick-connect shall be located driver's side pump panel.		

REQUIREMENT	YES	NO
WINTERIZATION **Gasket Disc/Intake Pump Panel** All intakes and discharges shall have gasket material provided on the pump module to hold in the heat of the module plumbing. **ELECTRICAL SYSTEMS** **Multiplex Electrical System** **Electrical System** The apparatus shall incorporate a Weldon V-MUX multiplex 12 volt electrical system. The system shall have the capability of delivering multiple signals via a CAN bus. The electrical system installed by the apparatus manufacturer shall conform to current SAE standards, the latest FMVSS standards, and the requirements of the applicable NFPA 1901 standards. The electrical system shall be pre-wired for optional computer modem accessibility to allow service personnel to easily plug in a modem to allow remote diagnostics. The electrical circuits shall be provided with low voltage over-current protective devices. Such devices shall be accessible and located in required terminal connection locations or weather-resistant enclosures. The over-current protection shall be suitable for electrical equipment and shall be automatic reset type and meet SAE standards. All electrical equipment, switches, relays, terminals, and connectors shall have a direct current rating of 125 percent of maximum current for which the circuit is protected. The system shall have electro-magnetic interference suppression provided as required in applicable SAE standards. Any electrical junction or terminal boxes shall be weather-resistant and located away from water spray conditions. **Multiplex System** For superior system integrity, the networked multiplex system shall meet the following minimum component requirements: • The network system must be Peer to Peer technology based on RS485 protocol. No one module shall hold the programming for other modules. One or two modules on a network referred to as Peer to Peer, while the rest of the network consists of a one master and several slaves is not considered Peer to Peer for this application.		

REQUIREMENT	YES	NO
• Modules shall be IP67 rated to handle the extreme operating environment found in the fire service industry. • All modules shall be solid state circuitry utilizing MOS-FET technology and utilize Deutsch series input/output connectors. • Each module that controls a device shall hold its own configuration program. • Each module should be able to function as a standalone module. No “add-on” module will be acceptable to achieve this form of operation. • Load shedding power management (8 levels). • Switch input capability for chassis functions. • Responsible for lighting device activation. • Self-contained diagnostic indicators. • Wire harness needed to interface electrical devices with multiplex modules. • The grounds from each device should return to main ground trunk in each sub harness by the use of ultrasonic splices. **Wiring** All harnessing, wiring and connectors shall be manufactured to the following standards/guidelines. No exceptions. • NFPA 1901-Standard for Automotive Fire Apparatus • SAE J1127 and J1127 • IPC/WHMA-A-620 – Requirements and Acceptance for Cable and Wire Harness Assemblies. (Class 3 – High Performance Electronic Products) All wiring shall be copper or copper alloys of a gauge rated to carry 125 of the maximum current for which the circuit is protected. Insulated wire and cable 8 gauge and smaller shall be SXL, GXL, or TXL per SAE J1128. Conductors 6 gauge and larger shall be SXL or SGT per SAE J1127. All wiring shall be colored coded and imprinted with the circuits function. Minimum height of imprinted characters shall not be less than .082” plus or minus .01”. The imprinted characters shall repeat at a distance not greater than 3”. A coil of wire shall be provided behind electrical appliances to allow them to be pulled away from mounting area for inspection and service work. **Wiring Protection** The overall covering of the conductors shall be loom or braid.		

REQUIREMENT	YES	NO
Braid style wiring covers shall be constructed using a woven PVC-coated nylon multifilament braiding yarn. The yarn shall have a diameter of no less than .04" and a tensile strength of 22 lbs. The yarn shall have a service temperature rating of -65 F to 194 F. The braid shall consist of 24 strands of yarn with 21 black and 3 yellow. The yellow shall be oriented the same and be next to each other. Wiring loom shall be flame retardant black nylon. The loom shall have a service temperature of -40 F to 300 F and be secured to the wire bundle with adhesive-backed vinyl tape. **Wiring Connectors** All connectors shall be Deutsch series unless a different series of connector is needed to mate to a supplier's component. The connectors and terminals shall be assembled per the connector/terminal manufacturer's specification. Crimble/Solderless terminals shall be acceptable. Heat shrink style shall be utilized unless used within the confines of the cab. **NFPA Required Testing of Electrical System** The apparatus shall be electrical tested upon completion of the vehicle and prior to delivery. The electrical testing, certifications, and test results shall be submitted with delivery documentation per requirements of NFPA 1901. The following minimum testing shall be completed by the apparatus manufacturer: **1. Reserve capacity test:** The engine shall be started and kept running until the engine and engine compartment temperatures are stabilized at normal operating temperatures and the battery system is fully charged. The engine shall be shut off and the minimum continuous electrical load shall be activated for ten (10) minutes. All electrical loads shall be turned off prior to attempting to restart the engine. The battery system shall then be capable of restarting the engine. Failure to restart the engine shall be considered a test fail. **2. Alternator performance test at idle:** The minimum continuous electrical load shall be activated with the engine running at idle speed. The engine temperature shall be stabilized at normal operating temperature. The battery system shall be tested to detect the presence of battery discharge current. The detection of battery discharge current shall be considered a test failure.		

REQUIREMENT	YES	NO
3. Alternator performance test at full load: The total continuous electrical load shall be activated with the engine running up to the engine 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 this test. However, an alarm sounded by excessive battery discharge, as detected by the system required in NFPA 1901 Standard, or a system voltage of less than 11.7 volts DC for a 12 volt nominal system, for more than 120 seconds, shall be considered a test failure. **4. Low voltage alarm test:** Following the completion of the above tests, the engine shall be shut off. The total continuous electrical load shall be activated and shall continue to be applied until the excessive battery discharge alarm activates. The battery voltage shall be measured at the battery terminals. With the load still applied, a reading of less than 11.7 volts DC for a 12 volt nominal system shall be considered a test failure. The battery system shall then be able to restart the engine. Failure to restart the engine shall be considered a test failure. **NFPA Required Documentation** The following documentation shall be provided on delivery of the apparatus: A. Documentation of the electrical system performance tests required above. B. A written load analysis, including: a. The nameplate rating of the alternator. b. The alternator rating under the conditions. c. Each specified component load. d. Individual intermittent loads. **Vehicle Data Recorder** A vehicle data recorder system shall be provided to comply with the 2009 and 2016 editions of NFPA 1901. The following data shall be monitored: • Vehicle speed MPH • Acceleration (from speedometer) MPH/Sec. • Deceleration (from speedometer) MPH/Sec. • Engine speed RPM • Engine throttle position % of full throttle • ABS Event On/Off • Seat occupied status Occupied Yes/No by position • Seat belt status Buckled Yes/No by position		

REQUIREMENT	YES	NO
• Master Optical Warning Device Switch On/Off • Time: 24-hour time • Date: Year/Month/Day **Occupant Detection System** There shall be a visual and audible warning system installed in the cab that indicates the occupant buckle status of all cab seating positions that are designed to be occupied during vehicle movement. The audible warning shall activate when the vehicle's park brake is released and a seat position is not in a valid state. A valid state is defined as a seat that is unoccupied and the seat belt is unbuckled, or one that has the seat belt buckled after the seat has been occupied. The visual warning shall consist of a graphical representation of each cab seat in the multiplex display screen that will continuously indicate the validity of each seat position. The system shall include a seat sensor and safety belt latch switch for each cab seating position, audible alarm and braided wiring harness. **HVAC Controls** The air conditioning and heating systems of the apparatus chassis cab shall be controlled through the multiplex electrical system`s color display(s). The system shall have the capability to provide automatic climate control. **Multiplex Display** The V-MUX multiplex electrical system shall include a Vista IV color display. The display shall have the following features: • Aspect ratio of 16:9 (Wide Screen) • Diagonal measurement of no less than 7" • Master warning switch • Engine high idle switch • Five (5) tactile switches to access secondary menus • Eight (8) multi-function programmable tactile switches • Specific door ajar indication • Real time clock • Provides access to the multiplex system diagnostics • Video capability for optional back-up camera(s) and GPS display		

REQUIREMENT	YES	NO
The display shall be located: • officer's side engine cover • top mount pump panel • driver's side engine cover. **Electrical Connection Protection** The vehicle electrical system shall be made more robust by the application of a corrosion inhibiting spray coating on all exposed electrical connections on the chassis and body. If equipped with an aerial device, the exposed connections on the aerial components shall also be protected. The coating shall use nanotechnology to penetrate at the molecular level into uneven surfaces to create a protective water repellant film. The coating shall protect electrical connections against the environmental conditions apparatus are commonly exposed to. **Smart Truck Technology** **User Interface** The apparatus shall be equipped with a smart truck technology system designed specifically for first responder apparatus. The system shall interconnect major apparatus CAN networks including but not limited to the chassis J1939/OBD2 data, vehicle multiplex system, water pump pressure governor, electric valves and electric actuated deck gun. The system shall securely report real-time vehicle information from these systems via cellular data to a globally supported cloud computing service for storage and real time access via web dashboards. The dashboards shall be accessible by the department's computers, tablets and smartphones. The smart truck technology installed on the apparatus shall provide real-time notification via text or e-mail when a check engine light is displayed. The notification shall include the fault code and brief explanation for the code to reduce down-time. The system shall feature a truck down feature on the web-based user interface to allow instant notification of needed apparatus service to both the authorized dealership and OEM via text or e-mail. The system shall provide remote diagnostics of vehicle subsystems such as VMUX, pressure governors, electric monitors and electric valves.		

REQUIREMENT	YES	NO
By use of the web-based user interface, the system shall allow for over the air programming updates to various subsystems should the need arise. The web-based user interface shall also provide the following: • Fuel and DEF levels • GPS tracking • Data logging for apparatus multiplex system • Easy access to the NFPA VDR data The smart truck technology shall also feature seamless integration to the HAAS ALERT Safety Cloud providing Responder to Vehicle (R2V) alerts to motorists using navigation apps such as WAZE. The system shall be designed with an open architecture to incorporate future growth with new technology partners designed to enhance fireground operations **Hardware** **Vehicle Gateway** The vehicle gateway module shall be rugged in construction using a durable cast aluminum enclosure designed for emergency vehicle applications. The module shall have sealed Deutsch connectors providing four (4) CAN network ports, one (1) RS-485 port, one (1) Ethernet RJ45 port, embedded cellular modem, Bluetooth and GPS capability. The IoT Core Vehicle Gateway shall be capable of 2 way vehicle telemetry, supporting both remote diagnostics and remote over-the-air software updates. **Antenna** A low-profile cellular antenna shall be installed on the cab roof. **Data Plan** A 5-year data plan shall be provided with the initial vehicle purchase. At the end of the 5-year period the department shall be given the option to extend service. **LIGHT BARS** **Light Bar Mount** One (1) pair of 2" tall mounts shall be provided on the front light bar.		

REQUIREMENT	YES	NO
Light Bar Mount Two (2) pairs of 2" tall mounts shall be provided on the side facing mini light bars. **Light Bars – Side Facing** A pair of Federal Signal Corporation 25" LED Navigator light bars model NVG25 shall be provided. Each bar shall contain three (3) 4x6 Quadraflare split red/white LEDs forward facing and one (1) 3x7 Quadraflare red LED side facing. Lens configuration is all clear. The light bar shall be installed in the following location: • each side over front cab doors. **Light Bar – Forward Facing** A Federal Signal Corporation 73" LED Navigator light bar model NVG73 shall be provided. The light bar shall have clear lenses and contain two (2) red/white SLR rotating LEDs (one each side outboard), four (4) 4x6 red Quadraflare forward facing LED modules and four (4) 4x6 split red/white Quadraflare forward facing LED modules. The light bar shall be installed in the following location: • centered on the front cab roof. **WARNING LIGHT PACKAGES** **Lower Level LED Warning Light Flash Rate** The lower level Federal Signal QuadraFlare and/or FireRay LED warning lights shall be set to QuadFlash 75 - Simultaneous pattern. **Lower Level Warning** Eight (8) Federal Signal FireRay model FR6 LED light heads and two (2) Federal Signal MicroPulse Ultra model MPS3 Ultra LED light heads shall be provided. The lights shall be Red with red lenses. The light heads shall be provided with chrome flanges (as applicable) mounted as close to the corner points of the apparatus (as is practical) as follows: • Two (2) FR6 light heads on the front of the apparatus facing forward. • Two (2) FR6 light heads on the rear of the apparatus facing rearward.		

REQUIREMENT	YES	NO
• Two (2) FR6 light heads each side of the apparatus, one (1) each side at the forward most point and one (1) centrally located to provide midship warning lighting. • Two (2) MPS3 Ultra LED light heads shall be mounted one (1) each side at the rearward most point (as practical). These will have clear lenses. The side facing lights shall be located at forward most position, centered in rear wheel well, and side facing at rear of body in rubrail if equipped. All warning devices shall be surface mounted in compliance with NFPA standards. **WARNING LIGHTS** **Hazard (Door Ajar) Light** There shall be a 2” red LED hazard light installed as specified. The light shall be located center overhead. **Warning Lights – Cab Wheelwell** Two (2) Federal Signal FireRay model FR6 LED (Light Emitting Diode) light heads with bezels shall be provided. The lights shall be Red with red lenses, Red with red lenses. The flashing lights shall be surface mounted where specified. Location: (1) each side of cab centered over wheel well, (1) each side in front quad inboard of NFPA warning light. **Warning Lights – Upper Level** Two (2) Federal Signal FireRay model FR9 LED (Light Emitting Diode) light heads with bezels (if applicable) shall be provided. The lights shall be Red with red lenses, Amber with colored lenses, Red with red lenses, Red with red lenses. The flashing lights shall be surface mounted where specified. Location: • One (1) each side rear compartment face up high • One (1) each side of body rear facing up high • One (1) each side of body on forward upper body corners • One (1) each side of body on rearward upper body corners.		

REQUIREMENT	YES	NO
DIRECTIONAL LIGHT BARS **Directional Light Bar Control Location** The directional light bar control head shall be located in the center overhead console offset to driver side. **Directional Light Wired to Warning Lights** The rear directional light bar shall be activated when the upper level warning lights are activated to provide additional lighting, in addition to the warning lights, when the vehicle is responding to a scene. **Recessed Directional Light Bar Mount** An area at the rear of the body shall be provided for recess mounting of a directional light bar. The recess shall reduce the opening height of the rear compartment(s) (if applicable). **Directional Traffic Warning Light** A Federal Viper EXT LED Signal Master model 320862 light bar with amber lens shall be installed at the rear of the apparatus. The unit shall be 31.0” long with six (6) Viper EXT LED heads. Four operating modes are available: left arrow, right arrow, split (center/out) and a flashing warning pattern. A Federal 331105 control shall be provided with LED indicators to emulate the warning pattern. Light bar dimensions are 31.0” long x 3.30” deep x 2.70" high. **Warning Lights – Traffic Clearing Lights** Two (2) Federal Signal LED TCL64C-W LED Traffic Clearing Light heads with bezels shall be provided. The rectangular flashing lights shall be surface mounted where specified. Location: (1) each side in front quad inboard of NFPA warning light. **SIRENS** **Electronic Siren** A Federal PA300 siren model 690010 solid state electronic siren with attached noise-canceling microphone shall be installed. The unit shall be capable of driving		

REQUIREMENT	YES	NO
a single high power speaker up to 200 watts to achieve a sound output level that meets Class ”A” requirements. Operating modes shall include Hi-Lo, yelp, wail, P.A., air horn and radio re-broadcast. The siren shall be recessed mounted in the cab. **Electronic Siren Control Location** The electronic siren control shall be located in the center overhead. **Mechanical Siren** A chrome plated and pedestal mounted Federal Q2B-P coaster siren shall be installed on top of the front bumper extension. An electric siren brake switch shall be located in the cab accessible to the driver. The siren shall be located driver side front bumper. **SPEAKERS** **Pump Panel Speaker** A Motorola HSN4040 15-Watt Water Resistant Loudspeaker shall be provided on the pump panel. An on-off switch shall be installed on the pump operator's panel, includes a 16-18 gauge audio cable run from the on-off switch to the center dash access panel, leave a 30" coil of wire. **Siren Speaker** One (1) Federal Signal model ES100 Dynamax 100 watt speaker shall be flush mounted as far forward and as low as possible on the front of the vehicle. A polished model MSFMT with stainless grille shall be provided on the outside of the speaker to prevent road debris from entering the speaker. Speaker dimensions shall be: 5.5 in. high x 5.9 in. wide x 2.5 in. deep. Weight = 5.5 lbs. The speaker shall produce a minimum sound output of 120 dB at 10 feet to meet current NFPA 1901 requirements. The speaker shall be located driver side front bumper, officer side front bumper.		

REQUIREMENT	YES	NO
DOT LIGHTING **License Plate Light** One (1) Truck-Lite model 15905 white LED license plate light mounted in a Truck-Lite model 15732 chrome plated plastic license plate housing shall be mounted at the rear of the body. **Tail Lights** One (1) Federal Signal FireRay model FR6-BTT red LED (Light Emitting Diode) light, one (1) Federal Signal FireRay model FR6-ARROW amber LED light and one (1) Federal Signal FireRay model FR6-BACKUP white LED light shall be installed in a 4 light housing in a vertical position each side at rear and wired with weatherproof connectors. Light functions shall be as follows: • LED red running light with red brake light in upper position. • LED amber populated arrow pattern turn signal in middle position. • LED white back-up light in lower position. A one-piece chrome trim casting shall be mounted around the three (3) individual lights in a vertical position. The lower space will be used by the 6” x 4” lower NFPA warning light. **License Plate Bracket** There shall be bracket fabricated from aluminum diamond plate, secured to rear of the body to accommodate a license plate. **LED Marker Lights** LED clearance/marker lights shall be installed on the cab. The body marker lights shall be TecNiq 3/4" grommet mounted LED. **Upper Cab:** • Five (5) amber LED clearance lights on the cab roof. **Lower Cab:** • One (1) amber LED side turn/marker each side of cab ahead of the front door hinge.		

REQUIREMENT	YES	NO
Upper Body: • One (1) red LED clearance light each side at rear of body, facing rear. **Lower Body:** • Three (3) red LED clearance lights centered at rear. • One (1) red LED clearance light side facing at the trailing edge on either side of the apparatus body. • One (1) amber LED clearance light side facing at front of body/pump module. • One (1) amber LED auxiliary turn light side facing at front of body/pump module. **LIGHTS - COMPARTMENT, STEP & GROUND** **Compartment Light Package** Two (2) TecNiq E45 LED compartment light strip shall be mounted in each body compartment greater than 4 cu. ft. Transverse compartments shall have four (4) lights, located two (2) each side of the body. Each light bar shall include super bright white LEDs mounted to circuit boards encapsulated in an aluminum extrusion using TecSeal with TPE sealed end caps. The lights shall produce approx. 300 lumens per foot and shall be provided with a limited lifetime warranty. Compartment lights shall be wired to a master on/off switch located in the cab. The wiring connection for the compartment lights shall be made with a weather-resistant plug in style connector. A single water and corrosion-resistant switch with a polycarbonate actuator and sealed contacts shall control each compartment light. The switch shall allow the light to illuminate if the compartment door is open. **Ground Lights** The apparatus shall be equipped with a sufficient quantity of lights to properly illuminate the ground areas around the apparatus in accordance with current NFPA requirements. The lights shall be TecNiq model T440 4” circular LED (Light Emitting Diode) with clear lenses mounted in a resilient shock absorbent mount for improved bulb life. The wiring connections shall be made with a weather resistant plug in style connector. Ground area lights shall be switched from the cab dash with the work light switch.		

REQUIREMENT	YES	NO
One (1) ground light shall be supplied under each side of the front bumper extension if equipped. Lights in areas under the driver and crew area exits shall be activated automatically when the exit doors are opened. **Recessed Step Light** Two (2) TecNiq model T440 recessed 4” LED light with clear lens shall be provided to illuminate the step at the location specified. Location: one (1) each side of the top mount walkway. **Cab Ground / Auxiliary Step Lights** The cab shall be equipped with a sufficient quantity of lights to properly illuminate the auxiliary steps and the ground areas below them in accordance with current NFPA requirements. The lights shall be EON LED (Light Emitting Diode) with clear lenses. The wiring connections shall be made with a weather resistant plug in style connector. The lights shall be switched from the cab dash with the work light switch. The lights shall also be activated automatically when the exit doors are opened. **LIGHTS - DECK AND SCENE** **Cab Scene Light Switching** The cab scene lights shall be wired to activate through the appropriate side cab door ajar switch. This application allows the cab scene lights to be used as additional illumination of the ground area for personnel entering or exiting the vehicle. The switching for this application is in addition to the standard cab scene light switching. **Crosslay Lights** Four (4) Federal Signal Commander model COM145LC-W LED (Light Emitting Diode) with clear lenses shall be provide to illuminate the crosslay. The wiring connection shall be made with a weather resistant plug in style connector. The lights shall be located rearward of the crosslay evenly spaced on angle brackets. The lights shall be operated by the work light switch in the cab.		

REQUIREMENT	YES	NO
Rear Work Lights Two (2) FireTech LED lights model FT-WL3500-FT-W shall be installed. The lights shall produce 1,981 effective lumens and have a white housing. The lights shall be switched with work light switch in the cab. Location: rear body/beavertail area on the trailing edge up high. **Hosebed Light** A FireTech LED light model WL2000 shall be installed at the front of the hosebed to provide hosebed lighting per current NFPA 1901. The hosebed light shall be switched with work light switch in the cab. **Scene Lights** Two (2) FireTech model FT-GESM, Guardian Elite LED Surface Mount scene lights with chrome flanges (when required) shall be provided. Each light shall produce 12.5K lumens. Lights shall be located: • one (1) each side rear compartment face up high • one (1) each side of cab, rearward of forward doors, up high and switched in cab (side facing lights switched separately). **LIGHTS - NON-WARNING** **LED Pump Panel Light Package** Two (2) TecNiq model E10 LED lights shall be mounted under a light shield directly above each side pump panel with the top mount panel having three (3) lights. The work light switch in the cab shall activate the lights when the parking brakes are set. **Pump Compartment Light** An LED light shall be provided in the pump compartment area for NFPA compliance. The light shall be an Optronics ILL22 Series that has a polycarbonate lense and sealed / waterproof housing. The light shall be wired through a switch inside the pump compartment access door / panel.		

REQUIREMENT	YES	NO
Engine Compartment Light There shall be lighting provided to illuminate the engine compartment area in compliance with NFPA 1901. The light shall be an Optronics ILL22 Series LED that has a polycarbonate lense, sealed / waterproof housing and integral switch. The light wiring circuit shall activate when the cab is tilted and master power is switched on. **CONTROLS / SWITCHES** **Door Ajar Alarm** An audible alarm shall be provided through the multiplex display(s) in the cab wired into the door ajar or indicator. **Foot Switch** A heavy-duty metal floor mounted foot switch shall be installed to operate the air horns. It shall be located officer's side for left foot. **Foot Switch** A heavy-duty metal floor mounted foot switch shall be installed to operate the Q2B siren. It shall be located officer's side for left foot. **Additional Switch** A 12-volt switch shall be provided. The switch shall be located: • pump operator's panel for pump panel lights • driver rear of body for rear work lights. **Additional Switch – Q2B Master Power** A 12-volt switch shall be provided to isolate the Q2B siren power source. The switch shall be located on the driver side overhead switch panel. **Switch** A relay shall be provided to allow operation of the specified 110/240 volt device from a remote location other than the circuit breaker box. The relay shall be		

REQUIREMENT	YES	NO
mounted in a weather resistant enclosure mounted near the breaker box or as instructed from engineering. A remote switch shall be mounted as specified. Location: • programmed to multiplex display for officer side 120V cab/body flood lights • programmed to multiplex display for driver side 120V cab/body flood lights • programmed to multiplex display for driver's side cab/body 120/240V scene light(s) • programmed to multiplex display for officer's side cab/body 120/240V scene light(s). **Hose Reel Switch** A foot-operated fully shielded rewind switch shall be provided to assist with rewinding the deployed hose. Location: below tailboard offset to officer side of B1. **CAMERAS / INTERCOM** **Camera Shield** A diamond plate protective shield shall be provided for the top and sides of a camera. The shield shall be designed not to impede in the operational envelope of the camera. **Camera, Officer Side** A Safety Vision model SV-622RS camera will be located on the officer side front corner of the cab. This camera will be interlocked with the turn indicator. The system shall include a cable with metallic waterproof threaded o-ring seal connectors to ensure positive connection between video cable and camera to prevent unplugging due to vibration resulting in video loss to vehicle operator. Requires the option for the Safety Vision back-up camera system which consists of the colored monitor, back-up camera and control box. **Camera, Driver Side** A Safety Vision model SV-622LS camera will be located on the driver side front corner of the cab. This camera will be interlocked with the turn indicator. The system shall include a cable with metallic waterproof threaded o-ring seal connectors to ensure positive connection between video cable and camera to prevent unplugging due to vibration resulting in video loss to vehicle operator.		

REQUIREMENT	YES	NO
Requires the option for the Safety Vision back-up camera system which consists of the colored monitor, back-up camera and control box. **Camera Back-Up** There shall be a Safety Vision camera model number SV-625B-KIT provided. The camera shall be mounted up high at the rear of the vehicle to provide a wide angle rear view with audio. The camera shall include a cable with metallic waterproof threaded o-ring seal connectors to ensure positive connection between video cable and camera to prevent unplugging due to vibration resulting in video loss to vehicle operator. The camera shall be interlocked with the chassis transmission. When the apparatus is placed in reverse the camera shall automatically be activated and when the transmission is placed in any other gear the screen shall return to the previously displayed screen. **Intercom 6 Cab, 1 Pump Panel** A FireCom intercom package shall be installed within the cab interior. One (1) model 5200D dual radio digital intercom with touch pad adjustable volume with advanced digital noise reduction circuitry. The intercom uses a durable membrane switch plate to control volume and change radios. This intercom provides hearing loss protection that can occur from exposure to high noise levels. The system contains: • One (1) FireCom model 5200D dual radio monitor shall be provided in the cab (two (2) year limited warranty). • Six (6) FireCom model HM-10 plug in modules shall be provided at each seated position. • One (1) FireCom model PP-20 plug in module shall be provided at the pump panel. • Six (6) NFPA compliant headset hooks, FireCom part number 108-0678-00 shall be provided at each seated position. **MISC ELECTRICAL** **Back-Up Alarm** An electronic back-up alarm shall be supplied. The 97 dB alarm shall be wired into the chassis back-up lights to signal when the vehicle is in reverse gear. **12 Volt DC Power Distribution Module** A Blue Sea model 5032 12 place, split bus fuse block with ground, 12 volt DC power distribution module shall be provided. The module shall provide two isolated		

REQUIREMENT	YES	NO
groups of six circuits, and shall be wired through switched hot and battery hot, and include a battery ground. Location: • behind officer's seat • L3 high on rear wall • R3 high on rear wall **GENERATOR** **6KW Hydraulic Generator** An Onan 6KW side draft hydraulic generator, model CMHG 6000, shall be provided and installed dunnage pan offset to driver side. The unit shall come equipped with: modular generator unit (which includes the hydraulic motor and filter, generator, and cooler), variable displacement hydraulic pump, hydraulic reservoir and a gauge panel. The gauge panel shall display voltage, hour meter, frequency, and amperage. The hydraulic motor, generator, blower, cooler, and necessary hydraulic components are enclosed in a stainless steel housing. The housing is lined with acoustical material to reduce noise levels. The modular generator unit shall be 32.00” long x 15.80” wide x 13.70” high and weigh approximately 179 pounds. The reservoir shall be mounted separately. The hydraulic pump shall be driven by a chassis transmission mounted power take off (PTO). A generator control / PTO engage switch shall be mounted on the cab instrument panel to engage the PTO and start the generator. **Ratings and Capacity** Rating 6000 watts continuous Volts: 120/240 volts Phase: Single, 4 wire Frequency: 60 Hz Amperage: 50 amps @ 120 volts or 25 amps @ 240 volts Engine speed at engagement: Below 1000 RPM		

REQUIREMENT	YES	NO
Operation Range: 975 to 2500 RPM 600 to 2500 RPM Aerial Only The generator shall be tested operating at 100 percent of its name plate voltage for a minimum of 2 hours in accordance with current NFPA 1901 standards. Notes: *All ratings and capacities shall be derived utilizing current NFPA 1901 test parameters. *Extreme ambient temperatures could affect generator performance. **GENERATOR TEST** **3rd Party Generator Testing** The generator shall be tested at the manufacturer`s facility by an independent, third-party testing service. The conditions and testing of the generator shall be as outlined in current NFPA 1901. The test shall include operating the generator for two hours at 100% of the rated load. Power source voltage, amps, frequency shall be monitored. The prime mover`s oil pressure, water temperature, transmission temperature (if applicable) and power source hydraulic fluid temperature (if applicable) shall be monitored during testing. The results of the test shall be recorded and provided with delivery documentation. **GENERATOR OPTIONS** **Generator Air Deflector** An air deflector to allow for exhausting up or down draft for an Onan hydraulic generator shall be provided on the air output side of the generator. The air deflector shall be constructed of stainless steel. **BREAKER BOXES** **Circuit Breaker Panel** An eight (8) place breaker box with up to six (6) appropriately sized ground-fault interrupter circuit breakers shall be supplied. The breaker box will include a master breaker sized according to the generator output which will occupy two (2) places. The breaker box will be located in the specified compartment, not to exceed 12` run of wire.		

REQUIREMENT	YES	NO
Dimensions: 12.50” high x 8.88” wide x 3.80” deep. Location: L1 forward wall. **LIGHTS - QUARTZ** **Cab Brow Light** One (1) FireTech 12V LED model FT-B-72-ML-W 75" white housing brow light with integral marker lights shall be provided. The light shall be installed on the front cab brow in place of the standard DOT marker lights. the light shall feature 54 LEDs` producing 19,665 usable lumens and five (5) DOT approved marker lights. The 285W 12V light shall draw 23.75 amps. **120V LED Flood Light – Body Sides** Fire Research Spectra LED scene light model SPA260-K20 surface mount light shall be installed. The light shall be mounted with four (4) screws to a flat surface. It shall be no more than 5-7/8" high by 14-1/2" wide and have a profile of less than 2-1/8" beyond the mounting surface. Wiring shall extend from the electronics box at the rear of the lamp head. The lamp head 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 120 volts AC, draw 1.5 amps, and generate 20,000 lumens of light. The lamp head shall have a unique lens that directs flood lighting onto the work area and focuses the spot light beam into the distance. The lamp head shall be powder coated and have a white bezel. The LED scene light shall be for fire service use. Location: • Forward upper body panel officer side (inboard of warning lights) • Forward upper body panel driver side (inboard of warning lights) • Rearward upper body panel officer side (inboard of warning lights) • Rearward upper body panel driver side (inboard of warning lights) **Telescopic Light Tower** Night Scan Chief NS 2.3 120/240 AC dual tilt with (4) Night Scan XL 200 LED light heads. Tower control to be located next to the breaker box. Tower to be located ahead of vista mounted side to side and hinged to driver side.		

REQUIREMENT	YES	NO
NOTE: LIGHT TOWER SHALL HAVE SWITCH IN CAB WITHIN REACH OF THE DRIVER - MECHANICAL AND VIRTUAL ON VMUX SCREEN. THIS SHALL OVERRIDE THE NORMAL FUSE SWITCH IN THE BREAKER BOX. **RECEPTACLES** **Receptacle** A 20-amp, 110 volt 3-prong straight blade NEMA 5-20 duplex household receptacle with stainless steel cover plate shall be installed in a non-weather exposed area as specified by the department. The receptacle shall be wired to the inlet receptacle where it will have overcurrent protection from an external source. Location: • In cab driver side on 3 x 3 post rear facing just above engine cover • In cab officer side on 3 x 3 post rear facing just above engine cover • L3 high on forward wall, R3 high on forward wall. **Receptacle** A Daniel Woodhead model #67W47 20-amp, 110-volt (NEMA #L5-20) twist lock receptacle and cover plate shall be installed as specified. Location: • driver side of gravel shield rearward • officer side of gravel shield rearward **ELECTRIC CORD REELS** **Rollers, Cord Reel** Rollers, captive for cord reel mounted on reel. Stainless steel cord reel rollers shall be installed and located on the reel. The rollers shall facilitate smooth removal of the electric cord. **Electric Cord Reel** Hannay electric rewind cord reel(s) (ECR 1616-17-18) shall be installed and located B1 back wall up high offset officer side.		

REQUIREMENT	YES	NO
The reel(s) shall include 200`of yellow 10-gauge 3 conductor type SOWA cord. The cord shall be rated at 20 amps @ 110 volts. The end of the cord shall be terminated for the installation of a department required connector. **Circle D Mounting Box** A Circle D model #213 cast aluminum mounting box shall be installed as specified for the Circle D junction box. Mount located for box with reel in or on B1 back wall up high offset officer side. **Electrical Junction Box** A Circle-D model PF51G four outlet electrical junction box shall be provided and shall have an integral pilot light to indicate electrical current. The unit shall be equipped with two (2) 120-volt 20-amp NEMA L5-20R twist-lock receptacles and two (2) 120-volt 15-amp NEMA 5-15R straight blade receptacles, each with a hinged weatherproof cover. Located on cord for reel in or on B1 back wall up high offset officer side. **Cord Reel Rewind Switch** A heavy-duty rubber covered electric reel rewind button shall be installed on wall near cord reel. **HAND TOOLS** **6` Pike Pole – D Handle**  One (1) 6` hollow fiberglass pike pole, 1-3/4” (1.75”) outside diameter, with painted steel pike and D handle shall be supplied. **10` Pike Pole – D Handle**  One (1) 10` hollow fiberglass pike pole 1-3/4” OD, with a painted steel pike and D handle shall be supplied. **HOSE / NOZZLES** **TFT Nozzle** A fully automatic nozzle for use with 3/4” (.75) or 1” hose, equipped with a stainless-steel slide type flow control shutoff, a built-in debris screen and a built-in		

REQUIREMENT	YES	NO
pistol grip handle shall be supplied. The nozzle shall be capable of 10-95 gpm and shall be constructed of hard anodized, corrosion resistant aluminum alloy. **Booster Hose [Qty: 2]** A 100` section (total of 200') of 1" synthetic rubber booster hose with vytacord reinforcement and an 800 psi rating shall be supplied. Couplings shall have a bright finish. **PVC Suction Hose 6" [Qty: 2]** • 6" X 10' PVC LIGHTWEIGHT SUCTION ONLY HOSE • Special corrugated PVC exterior for maximum flexibility and smooth waterway • Clear flexible PVC between the helix for ribs for full vision of water • Distinctive black colored helix ribs for maximum UV protection • One-piece extruded aluminum field repairable, reattachable collars on 6" NST female x 6" Rocker lug NST Male couplings • Ultra flexible and lightweight, one-man hook-up operation if necessary • Designed for full vacuum • Clear for full vision of water flow • Meets and exceeds all NFPA Standards 1961, current edition **Monitor Tips** The Akron monitors with 2.5" NH outlet shall have quad stacked deluge tips (style 2499) provided and shipped loose with the unit. **GROUND LADDERS** **Alco-Lite Folding Ladder** One (1) Alco-Lite FL-10, 10` aluminum folding ladder shall be provided. Both ends shall be equipped with molded rubber end caps and the ladder shall have handles for easy carrying. The ladder shall meet or exceed the requirements of the current edition of NFPA 1931.  **ALCO-LITE ROOF LADDER**  An Alco-Lite PRL-14, 14` aluminum roof ladder shall be provided. Folding steel roof hooks shall be attached to one end of the ladder with steel spikes on the other.		

REQUIREMENT	YES	NO
ALCO-LITE EXTENSION LADDER One (1) Alco-Lite PEL-24, 24` aluminum 2-section extension ladder shall be provided. The ladder shall meet or exceed the requirements of the current edition of NFPA 1931. **MISC LOOSE EQUIPMENT** **DOT Required Drive Away Kit** Three (3) triangular warning reflectors with carrying case shall be supplied to satisfy the DOT requirement. **Headset – Driver, Officer and Pump Panel [Qty: 3]** A FireCom headset shall complement the intercom system selected. Three (3) model UH-51 “under the helmet” headset. ComLeather ear seals are used as part of the headset for comfort and noise reduction. **The intercom shall be ordered separately and is not included as part of the headset(s).** Controls include: • Red button push to talk over radio. • Full duplex intercom and listen only when button is not engaged. • Three (3) way adjustable boom. • Plug in is glove rugged design. Specifications include: • Noise cancellation (electret) microphone. • Operating temperature range of – 40 to 158 F. • Headset noise reduction of 24db. • Includes five (5) years of FireCom technical support and customer care. **Headset – Firefighters [Qty: 4]** A FireCom headset shall complement the intercom system selected. Four (4) model UH-52 “under the helmet” headset (no radio transmit). ComLeather ear seals are used as part of the headset for comfort and noise reduction.		

REQUIREMENT	YES	NO
Controls include: • Black button push and hold to talk over intercom. • Full duplex intercom when push button engaged, and listen only when button is not engaged. • Three (3) way adjustable boom. • Plug in is glove rugged design. Specifications include: • Noise cancellation (electret) microphone. • Operating temperature range of – 40 to 158 F. • Headset noise reduction of 24db. • Includes five (5) years of FireCom technical support and customer care. **EXTERIOR PAINT** **Paint Break with Dip to Grille** The cab shall have a two-tone paint break. The break line shall be approximately 31.5 inches below the cab roof drip rail. The paint break shall include a dip down to the corners of the cab grille. **Painted Pump/Pre-Connect Module(s)** The apparatus pump/pre-connect module(s) shall be painted job color. The paint process shall match what is applied to the body. **Paint Spray Out** A paint sample spray out of the cab two-tone paint colors will be provided for approval prior to painting. • 795462EG YELLOW (FLNA 6064 YELLOW) • L0006EG WHITE **Paint Custom Cab** The apparatus cab shall be painted Sikkens as specified (Does not include metallic paint). 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.		

REQUIREMENT	YES	NO
The aluminum 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 Sikkens high solid LV products and be performed in the following steps: • Corrosion Prevention - all aluminum surfaces shall be pre-treated with the Alodine 5700 conversion coating to provide superior corrosion resistance and excellent adhesion of the base coat. • Sikkens Sealer/Primer LV - acrylic urethane sealer/primer shall be applied to guarantee excellent gloss hold-out, chip resistance and a uniform base color. • Sikkens High Solid LVBT650 (Base coat) - a lead-free, chromate-free high solid acrylic urethane base coat shall be applied, providing excellent coverage and durability. A minimum of two (2) coats shall be applied. • Sikkens High Solid LVBT650 (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 20-degree gloss meter. Coating thickness shall be measured with a digital MIL gauge and the orange peel with a digital wave scan device. **Paint Cab Two-Tone Color** The upper section of the cab shall be painted As Specified (Does not include metallic paint). The paint process of the secondary cab color shall be the same as the primary color.		

REQUIREMENT	YES	NO
Paint Body Small The apparatus body shall be painted Sikkens As Specified (Does not include metallic paint). 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 aluminum 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 Sikkens high solid LV products and be performed in the following steps: • Corrosion Prevention - all aluminum surfaces shall be pre-treated with the Alodine 5700 conversion coating to provide superior corrosion resistance and excellent adhesion of the base coat. • Sikkens Sealer/Primer LV - acrylic urethane sealer/primer shall be applied to guarantee excellent gloss hold-out, chip resistance and a uniform base color. • Sikkens High Solid LVBT650 (Base coat) - a lead-free, chromate-free high solid acrylic urethane base coat shall be applied, providing excellent coverage and durability. A minimum of two (2) coats shall be applied. • Sikkens High Solid LVBT650 (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 20-degree gloss meter. Coating thickness shall be measured with a digital MIL gauge and the orange peel with a digital wave scan device.		

REQUIREMENT	YES	NO
Paint Body Two Tone Color The body shall be painted two tone. The upper section of the body shall be painted white – the same colour as the cab roof. Paint break will be just above body door drip rail. **Paint Rear Body** Rear body surface shall have a painted job color finish. Includes hinged doors that do not have discrete sales codes and removable panels. **INTERIOR PAINT** **Cab Interior Paint** The interior of the cab shall be painted Zolatone gray #20-64. Prior to painting, all exposed interior metal surfaces shall be pretreated using a corrosion prevention system. **STRIPING** **Reflective Stripe in Rubrail** The reflective stripe in the body rubrail shall be white. **Cab and Body Stripe** A single Scotchlite stripe, up to 10 inches in width shall be installed on the cab and body. The stripe shall have a hockey style, Z or S style or any other customer specific design style. The stripe design shall match existing KFD apparatus. The stripe shall be NFPA compliant and the size, color and location shall be as specified by the customer. **CAB AND BODY STRIPE [Qty: 2]** An additional Scotchlite stripe, up to 3 inches in width shall be installed on the cab and body. The stripe shall be NFPA compliant and the design, size, color and location shall be as specified by the customer. **Scotchlite Cab Stripe** Scotchlite cab stripe shall be 3/4” in width total, 1/2” gold stripe with a 1/8” customer specified color outline on both sides and a clear polyurethane coating.		

REQUIREMENT	YES	NO
Stripe shall be centrally located and shall contour with the cab, following the paint break. **Rear Body 3M Diamond Grade Striping** Chevron style 3M Diamond Grade striping shall be provided on the rear of the apparatus. The stripes shall consist of 6" Red/Fluorescent Yellow Green alternating stripes in an "A" pattern. The striping shall be located on the rear facing extrusions, panels and doors inboard and outboard of the beavertails if applicable. **GRAPHICS** **Graphics Drawing** A graphics drawing shall be provided for the apparatus. The drawing shall include striping, lettering and logos meeting NFPA guidelines. The drawing shall be presented for review and approval by the end user prior to application of the graphics. **WARRANTY / STANDARD & EXTENDED** **Standard 1 Year Warranty** The apparatus manufacturer shall provide a full 1-year standard warranty. All components manufactured by the apparatus manufacturer shall be covered against defects in materials or workmanship for a 1-year period. All components covered by separate suppliers such as engines, transmissions, tires, and batteries shall maintain the warranty as provided by the component supplier. A copy of the warranty document shall be provided with the proposal. **Lifetime Frame Warranty** The apparatus manufacturer shall provide a full lifetime frame structural warranty. This warranty shall cover all apparatus manufacturer designed frame, frame members, and cross-members against defects in materials or workmanship for the lifetime of the covered apparatus. A copy of the warranty document shall be provided with the proposal. Frame warranties that do not cover cross-members for the life of the vehicle shall not be acceptable. **10 Year 100,000 Mile Structural Warranty** The apparatus manufacturer shall provide a comprehensive 10 year/100,000 mile structural warranty. This warranty shall cover all structural components of the cab and/or body manufactured by the apparatus manufacturer against defects in materials or workmanship for 10 years or 100,000 miles, whichever occurs first. Excluded from this warranty are all hardware, mechanical items, electrical items,		

REQUIREMENT	YES	NO
or paint finishes. A copy of the warranty document shall be provided with the proposal. **10 Year Stainless Steel Plumbing Warranty** The apparatus manufacturer shall provide a full 10-year stainless steel plumbing components warranty. This warranty shall cover defects in materials or workmanship of apparatus manufacturer designed foam/water plumbing system stainless steel components for 10 years. A copy of the warranty document shall be provided with the proposal. **10 Year Paint and Corrosion Warranty** The apparatus manufacturer shall provide a 10-year limited paint and corrosion perforation warranty. This warranty shall cover paint peeling, cracking, blistering, and corrosion provided the vehicle is used in a normal and reasonable manner. The paint shall be prorated for 10 years as follows: **Topcoat & Appearance:** (Gloss, Color Retention, Cracking) 0 to 72 months 100% 73 to 120 months 50% **Coating System, Adhesion & Corrosion:** (Includes Dissimilar metal corrosion, Flaking, Blistering, Bubbling) 0 to 36 months 100% 37 to 84 months 50% 85 to 120 months 25% Corrosion perforation shall be covered 100% for 10 years. Corrosion perforation is defined as complete penetration through the exterior metal of the apparatus. The warranty period shall begin upon delivery of the apparatus to the original user-purchaser. A copy of the warranty document shall be provided with the proposal. UV paint fade shall be covered in a separate warranty supplied by Akzo Nobel (Sikkens) and shall be for a minimum of 10 years. **25 Year Frame Rail Corrosion Warranty** The chassis manufacturer shall provide a 25 year corrosion warranty on the chassis frame rails. This warranty shall cover the chassis frame rails, including frame rail liners (if equipped), for a period of 25 years after the date on which the vehicle is delivered to the original purchaser. A copy of the warranty document		

REQUIREMENT	YES	NO
shall be provided with the proposal. Please refer to warranty document for complete details and exclusions. **20 Year Frame Components Corrosion Warranty** The chassis manufacturer shall provide a 20 year corrosion warranty on the galvanized chassis frame components. This warranty shall cover the front frame extensions, chassis crossmembers (from engine rearward), battery tray brackets and rear underbody support (if applicable) for a period of 20 years after the date on which the vehicle is delivered to the original purchaser. A copy of the warranty document shall be provided with the proposal. Please refer to warranty document for complete details and exclusions. **Meritor Front Axle Warranty** A warranty shall be provided for the front axle by Meritor Automitive. The warranty period shall be as follows based on axle type: • FL-941, FL-943 and MFS up to 21,500: 5-year / unlimited miles parts and labor • MFS rated at 22,800: 2-year / 200,000 miles parts and labor • Front drive axle: 2-year / unlimited miles parts and labor **Meritor Rear Axle Warranty** A 5-year/unlimited miles, 5-year parts and 5-year labor rear drive single or rear drive tandem axle warranty shall be provided by Meritor Automotive. **SUPPORT, DELIVERY, INSPECTIONS AND MANUALS** **Pump Panel Approval Drawing** A detailed large-scale approval drawing of the pump panel(s) shall be provided. The drawing shall be provided on an purchased unit prior to the construction process. **Approval Drawings** A general arrangement drawing depicting the vehicles appearance shall be provided. The drawing shall consist of left side, right side, front, and rear elevation views. Vehicles requiring pump controls shall include a general arrangement view of the pump operator`s position, scaled the same as the elevation views.		

REQUIREMENT	YES	NO
Approval Drawings - Dash Panel Layout A detailed large-scale approval drawing of the dash/console panel layout shall be provided. The drawing shall be provided on an purchased unit prior to the construction process. **Electronic Manuals** Two (2) copies of all operator, service, and parts manuals MUST be supplied at the time of delivery in digital format -NO EXCEPTIONS! The electronic manuals shall include the following information: • Operating Instructions, descriptions, specifications, and ratings of the cab, chassis, body, aerial (if applicable), installed components, and auxiliary systems. • Warnings and cautions pertaining to the operation and maintenance of the fire apparatus and firefighting systems. • Charts, tables, checklists, and illustrations relating to lubrication, cleaning, troubleshooting, diagnostics, and inspections. • Instructions regarding the frequency and procedure for recommended maintenance. • Maintenance instructions for the repair and replacement of installed components. • Parts listing with descriptions and illustrations for identification. • Warranty descriptions and coverage. The electronic document shall incorporate a navigation page with electronic links to the operator`s manual, service manual, parts manual, and warranty information, as well as instructions on how to use the manual. Each copy shall include a table of contents with links to the specified documents or illustrations. The electronic document must be formatted in such a manner as to allow not only the printing of the entire manual, but to also the cutting, pasting, or copying of individual documents to other electronic media, such as electronic mail, memos, and the like. A find feature shall be included to allow for searches by text or by part number. These electronic manuals shall be accessible from any computer operating system capable of supporting portable document format (PDF). Permanent copies of all pertinent data shall be kept file at both the local dealership and at the manufacturer`s location. NOTE: Engine overhaul, engine parts, transmission overhaul, and transmission parts manuals are not included.		

REQUIREMENT	YES	NO
Fire Apparatus Safety Guide Fire Apparatus Safety Guide published by FAMA, latest edition. This safety manual is intended to point out some of the basic safety situations that may be encountered during the normal operation and maintenance of a fire apparatus and to suggest possible ways of dealing with these situations. This manual is NOT a substitute for the manufacturer`s fire apparatus operator and maintenance manuals or commercial chassis manufacturer`s operator and maintenance manuals.		