SPECIFICATIONS	BIDDER COMPLY	
	YES	NO
INTENT OF PROPOSAL SPECIFICATIONS It is the intent of these PROPOSAL specifications to cover the furnishing and delivery, to the Goodlettsville Fire Department a complete pumper apparatus equipped as hereinafter specified. These proposal specifications exceed the minimum requirements of the Fire Department and are intended to provide details of construction and materials, and where not otherwise specified are left to the discretion of The apparatus manufacture. The apparatus manufacture. shall be solely responsible for the design and construction of all non-specified features. The apparatus shall conform to the current edition of the National Fire Protection Associations Pamphlet. The apparatus manufacture. as an established manufacturer with a certainty of being capable of furnishing parts, service and technical assistance for the next TWENTY (20) Years. This bid is accompanied by a set of manufacturer's specifications consisting of a detailed description of the apparatus and equipment proposed and to which the apparatus furnished under contract must conform. **BID PRICE** The bid price shall be for one (1) apparatus that shall be listed on the proposal page in the bid book. There shall be an option on the proposal page for the trade in of Goodlettsville 1996 E-One Cyclone custom pumper. Goodlettsville shall choose this option if applicable. **QUALITY AND WORKMANSHIP** The design of the apparatus proposed shall embody the modular design and construction technique as outlined. The workmanship is of the highest quality in its respective field. Special consideration has been given to the following points: accessibility of the various components, which require periodic maintenance operations for ease of operation, including both pumping and driving operations and symmetrical proportioning of the overall apparatus.		

Construction utilized shall be rugged and safety factors have been provided to carry loads as specified and to meet the road requirements and speed conditions as set forth under "Performance Tests and Requirements". Welding shall not be employed in the assembly of the apparatus in a manner that shall prevent the removal of major component parts for service and/or repair. This includes the following but is not limited to compartment doors, hinges, fender liners, running boards, hosebeds, and pump panels, etc. **VEHICLE STABILITY** A. The height of the fully loaded vehicle center of the gravity shall not exceed the chassis manufacturer maximum. B. The front to rear weight distribution of the fully loaded vehicle shall be within the limits set by the chassis manufacturer. The front axle loads shall not be less than the minimum axle loads specified by the chassis manufacturer, under full load and all other loading conditions. C. Difference in weight on the end of each axle, from side to side, when the vehicle is fully loaded and equipped shall not exceed 7%. **PERFORMANCE TEST AND REQUIREMENTS** A. The apparatus shall meet the performance requirements at elevations of 2000 feet (610 m) above sea level. B. The apparatus shall meet the performance requirements while stationary on any grade of up to and including 6% in any direction. C. From a standing start, the vehicle shall attain a true speed of 35 mph (56 kmph), within 25 seconds on a level road. D. The apparatus shall obtain a minimum top speed of 50 mph (80 kmph) on a level road. E. The apparatus shall be able to maintain a speed of at least 20 mph (32 kmph) on any grade up to and including 6%. F. The apparatus shall be tested and approved by Underwriters Laboratories Incorporated in accordance with the standard practices for pumping engines. **ROAD TESTS**		

Road test shall be conducted to verify that the complete apparatus is capable of compliance: A. Test shall be conducted on a dry, level, paved road that is in good condition. The engine shall not operate in excess of the maximum no load governed speed. B. Acceleration test shall consist of two run in opposite direction over the same route. C. The vehicle shall attain a true speed of 35 mph (56 kmph) from a standing start within 25 seconds. D. The vehicle shall attain a minimum top speed of not less than 50 mph (80 kmph). E. If the apparatus is equipped with an auxiliary braking system; The apparatus manufacture. shall road test the vehicle to confirm that the system is functioning as intended by the manufacturer. F. The service brakes shall bring the fully laden apparatus to a complete stop from an initial speed of 20 mph (32 kmph), in a distance net exceeding 35 feet (10.7 m) by actual measurement, on a substantially hard, level surface road that is free of loose material, oil, or grease. **FAILURE TO MEET TESTS** In the event the apparatus fails to meet the test requirements of these specifications on the first trials, second trials may are made at the option of the The apparatus manufacture. within thirty-(30) days of the date of the first trials. Such trials shall be final and conclusive and failure to comply with changes, as the purchaser may consider necessary to conform to any clause of the specifications within thirty-(30) days after notice is given to The apparatus manufacture. of such changes shall also because of rejection of the apparatus. Permission to keep or store the apparatus in any building owned or occupied by the purchaser or its use by the Fire Department during the above-specified period with the permission of the The apparatus manufacture. shall not constitute acceptance. **PRODUCT LIABILITY INSURANCE**		

Due to the high cost of replacement of said Fire Apparatus and to protect the customer of his full rights, The apparatus manufacture. carries garage liability insurance equal to or in excess of $26,000,000.00. **DELIVERY** The apparatus manufacture. shall deliver the completed apparatus in 220 to 240 calendar days after acceptance of the formal contract. The apparatus manufacture. shall not be held liable for changes arising from its failure to make or delay in making delivery because of fire, flood, strike, riot, chassis shortage, accidents, acts of God, or any circumstances beyond our control. **INFORMATION SUPPLIED AT TIME OF DELIVERY** Information required at time of delivery to be supplied by The apparatus manufacture. shall include: (1) The manufacturer's record of apparatus construction details, including the following information: (a) Owner's name and address (b) Apparatus manufacturer, model, and serial number (c) Chassis make, model, and serial number (d) GVWR of front and rear axles (e) Front tire size and total rated capacity in pounds (kilograms) (f) Rear tire size and total rated capacity in pounds (kilograms) (g) Chassis weight distribution in pounds (kilograms) with water and manufacturer-mounted equipment (front and rear) (h) Engine make, model, and serial number, rated horsepower, related speed, and governed speed (i) Type of fuel and fuel tank capacity (j) Electrical system voltage and alternator output in amps (k) Battery make, model, and capacity in cold cranking amps (CCA)		

(1) Chassis transmission make, model, and serial number; and if so equipped, chassis transmission PTO(s) make, model, and gear ratio (m) Pump make, model, rated capacity in gallons per minute (liters per minute where applicable), and serial number (n) Pump transmission make, model, serial number, and gear ratio (o) Auxiliary pump make, model, rated capacity in gallons per minute (liters per minute where applicable), and serial number (p) Water tank certified capacity in gallons or liters (q) Aerial device type, rated vertical height in feet (meters), rated horizontal reach in feet (meters), and rated capacity in pounds (kilograms) (r) Paint manufacturer and paint number(s) (s) Company name and signature of responsible company representative (2) Certification of slip resistance of all stepping, standing, and walking surfaces (3) If the apparatus has a fire pump or an industrial supply pump, the pump manufacturer's certification of suction capability (4) If the apparatus has a fire pump or an industrial supply pump, a copy of the apparatus manufacturer's approval for stationary pumping applications (5) If the apparatus has a fire pump or an industrial supply pump, the engine manufacturer's certified brake horsepower curve for the engine furnished, showing the maximum governed speed (6) If the apparatus has a fire pump or an industrial supply pump, the pump manufacturer's certification of the hydrostatic test (7) If the apparatus has a fire pump or an industrial supply pump, the certification of inspection and test for the fire pump or the industrial supply pump (8) If the apparatus has an aerial device, the certification of inspection and test for the aerial device (9) If the apparatus has an aerial device, all the technical information for required inspections to comply with NFPA 1914, Standard for Testing		

Fire Department Aerial Devices (10) If the apparatus has a fixed line voltage power source, the certification of the test for the fixed power source (11) If the apparatus is equipped with an air system, test results of due air quality, the SCBA fill station, and the air system installation (12) Weight documents from a certified scale showing actual loading on the front axle, rear axle(s), and overall fire apparatus (with the water tank full but without personnel, equipment, and hose) (13) Written load analysis and results of the electrical system performance tests required in Chapter 13 (14) When the apparatus is equipped with a water tank, the certification of water tank capacity The apparatus manufacture. shall also provide documentation of the following items for the entire apparatus and each major operating system or major component of the apparatus: (1) Manufacturer's name and address (2) Country of manufacture (3) Source for service and technical information (4) Parts replacement information (5) Descriptions, specifications, and ratings of the chassis, pump (if applicable), and aerial device (if applicable) (6) Wiring diagrams for low voltage and line voltage systems to include the following information: (a) Pictorial representations of circuit logic for all electrical components and wiring (b) Circuit identification (c) Connector pin identification (d) Zone location of electrical components (e) Safety interlocks		

(f) Alternator-battery power distribution circuits (g) Input/output assignment sheets or equivalent circuit logic implemented in multiplexing systems (7) Lubrication charts (8) Operating instructions for the chassis, any major components such as a pump or aerial device, and any auxiliary systems (9) Precautions related to multiple configurations of aerial devices, if applicable (10) Instructions regarding the frequency and procedure for recommended maintenance (11) Overall apparatus operating instructions (12) Safety considerations (13) Limitations of use (14) Inspection procedures (15) Recommended service procedures (16) Troubleshooting guide (17) Apparatus body, chassis, and other component manufacturer's warranties (18) Special data required by this standard (19) Copies of required manufacturer test data or reports, manufacturer certifications, and independent third-party certifications of test results (20) A material safety data sheet (MSDS) for any fluid that is specified for use on the apparatus The apparatus manufacture. shall deliver with the apparatus all manufacturers' operations and service documents supplied with components and equipment that are installed or supplied. **LIABILITY**		

The apparatus manufacture. if deemed the successful bidder shall defend any and all suits assume all liability for the use of any patented process, advice or article forming a part of the apparatus or any appliance furnished under contract. We respectfully request you carefully review our bid proposal and if you have any questions or require additional information, we welcome the opportunity to meet with you. **PAYMENT TERMS** Full payment shall be made upon delivery and acceptance of the apparatus. The vehicle(s) shall not be released to the BUYER until payment is made. If the selling price is subject to any taxes, the taxes added will be that which are prevailing at the time of delivery. Payment shall be made directly to THE APPARATUS MANUFACTURE. Payment shall be made in United States Currency. No checks or any other form of payment shall be made to any sales representatives, dealer, agents, etc. If these payment terms are not strictly adhered to, The apparatus manufacture. shall assess a daily interest charge based on an annual percentage rate of 18% on the unpaid balance. If more than one vehicle is covered by this contract and the vehicles are shipped on different dates, the terms stated above shall apply to each vehicle. **VIRTUAL MANUFACTURING** The manufacturer shall have a web site available for the customers to 'watch' their unit being produced. The "Trucks in Production" shall be updated a minimum of three-(3) times per week. The web site shall also include documentation of cab and body crash tests, take a virtual tour of the production facility, videos of both current and new innovative products, updates on trade shows, photos of new deliveries and the opportunity to include customer 'Action Photo's'. Customer shall be able to access the web site without the requirement of a password. **CERTIFIED WELDERS** The manufacturer shall employ individuals that are certified aluminum and stainless steel welders. The welders shall be certified by an outside testing laboratory. The certifications shall be available for viewing		

through the Human Resources office upon request. **BODY WEIGHT DOCUMENTATION** The manufacturer shall body weigh each body prior to mounting on the chassis. The information shall be included in the documentation of the finished vehicle. Each body produced by the manufacturer shall be weighed, not just one body per model. **APPROVAL DRAWING** Prior to construction, the successful bidder shall provide three approval drawings of the apparatus for the fire department's review. The drawings shall show such items as the chassis being utilized, lights, horns, sirens, pump panels, and all compartment locations and dimensions. The blueprint shall be a visual interpretation of the unit as it is to be constructed. The buying authority shall sign all drawings. One print shall be retained by the Fire Department, the dealer shall retain one print, and one print, shall be returned to the manufacturer. **PRE-CONSTRUCTION CONFERENCE** A pre-construction conference will be held at the factory prior to the actual construction of the vehicle(s). The conference will be held in the manufactures facility with Two (2) representatives of the Fire Department and appropriate representatives of the manufacture. Transportation, lodging and meals will be the responsibility of the manufacture. **FINAL INSPECTION TRIP** There will be a final inspection for Two (2) representatives of the buying authority at the facility where the apparatus is being constructed. The inspection trip will be completed when the chassis is complete. Factory and Sales representatives will be available at the time of inspection. Transportation, lodging and meals will be the responsibility of the manufacturer. **TRANSPORTATION** To insure proper break-in of all components while still under warranty, the apparatus shall be delivered over the road under its own power (Rail and/or truck freight shall not be acceptable).		

MANUFACTURER SERVICE CONTACTS The manufacturer must have a 24 hour/ 7 day a week, toll-free emergency hot line. The manufacturer must be capable of providing both in-house and on-site service for the apparatus. The service technicians shall be EVT certified in compliance with NFPA 1071 classifications F2 through F6. On-site service and maintenance shall be the primary function, to eliminate the vehicle having to leave the fire department jurisdiction. Copies of the certifications shall be made available through the Human Resources office. **SERVICE VEHICLES** The manufacturer shall have a minimum of 10 full time, company owned, service vehicles. The vehicles shall be available 24 hours a day, seven days a week to respond to customer needs. The Service Vehicles shall be operated by full time EVT Certified Technicians. **REPLACEMENT PARTS** Replacement parts shall be available directly from the manufacturer, as well as the dealer and or service centers. **CUSTOM CHASSIS** It is the intent of the technical specifications contained herein to ensure the custom cab and chassis specified shall be engineered, designed, and manufactured exclusively for heavy-duty continuous use in extreme environments and rigorous adverse conditions. Each custom cab and chassis shall be manufactured in strict compliance with all applicable requirements as set forth in the current edition of the NFPA (National Fire Protection Association) pamphlet 1901 with maximum safety as the key focus throughout the design and development phase of each fire and rescue chassis. **CHASSIS FRAME RAILS** The chassis frame rails shall be constructed of 110,000-PSI minimum yield steel that has been formed into a "C" channel shape with dimension of 10.50" x 3.50" x .375 inches. An inner frame liner of 110,000 Pound minimum yield with dimension of 9.69" x 3.13" x .313" shall be provided for additional strength and to reduce deflection. The frame liner shall run from centerline of front axle to rear of the mainframe rail. This liner shall be mitered at 45 degrees at		

the front axle. The resulting frame system shall have a minimum section modulus of 30.38 cubic inches with a resisting bending moment of 3,342,000-inch pounds per rail. The frame rails shall be powder coated in order to insure superior paint adhesion. Frame cutouts for the engine shall be made with a plasma torch in order to minimize the heat-affected zone caused by the cut. All frame-mounted components shall be secured with grade eight bolts with hardened washers and distorted thread locknuts. Flanged head bolts with nylon locking nuts, or huck bolts shall not be acceptable. **PAINT, FRAME RAIL** The frame and running gear shall be painted gloss enamel black. The running gear shall consist of the axles, drivelines, air tanks, steering gear, frame mounted brackets, drag link, and fuel tank. The air system piping and electrical harnesses shall not be installed until after the paint has cured. This shall insure complete coverage behind those items as well as that air piping and wiring harnesses are not. **FRONT TOW EYES** Two-(2) chrome plated tow hooks shall be mounted to the bottom of the front bumper frame extension rails. The tow hooks shall be attached with Grade 8 bolts. **FRONT BUMPER** There shall be a 12” high, two rib front bumper constructed of highly polished, 10 gauge stainless steel. The bumper shall be a full wrap around type extending across the entire width of the cab. The return portion of the wrap around shall make up the majority of the bumper extension, measuring up to 24” in length. **FRONT BUMPER EXTENSION** There shall be a twenty-four inch (24”) frame extension provided. The extension shall be made from heavy-duty steel in both C-channel and tubular shapes. The frame rail extension material shall measure 7” high x 3-1/2” wide x .375” wall thickness. Extension shall be bolted to the chassis frame rails through reinforcement		

plates, backed by the engine mounting crossmember. Fasteners utilized shall be Grade 8 bolts. **GRAVELSHIELD** A gravelshield constructed of 1/8" (.125") embossed aluminum tread plate shall be installed above the frame extension between the bumper and the front face of the cab. **BUMPER COMPARTMENT, CENTER** There shall be a compartment provided in the front bumper gravel shield, centered between the frame rails fabricated of 1/8" (.125) smooth aluminum plate with drain holes to promote airflow. **FLOOR TILE, CENTER FRONT BUMPER COMPARTMENT** The center front bumper compartment floor shall be covered with Turtle Tile. The tile shall be black in color. The floor tile shall be completely removable for cleaning. **COVER, CENTER FRONT BUMPER COMPARTMENT** The center bumper compartment shall have a raised hinged aluminum tread plate cover to secure the contents. The cover shall be secured in the closed position with a stainless steel latch. **AIR HORN, PASSENGER'S SIDE** There shall be one-(1) 24" long Grover air horn installed in compliance with NFPA thru the front bumper, passenger's side, outboard of the frame rail. The air horn shall be plumbed to the chassis, air supply system thru an air protection valve, and manufactured from spun brass material with an easily separated die cast sounding unit for serviceability. **AIR HORN, DRIVER'S SIDE** There shall be one-(1) 24" long Grover air horn installed in compliance with NFPA thru the front bumper, driver's side, outboard of the frame rail. The air horn shall be plumbed to the chassis, air supply system thru an air protection valve, and manufactured from spun brass material with an easily separated die cast sounding unit for serviceability. **AIR HORN FOOT SWITCHES** Two-(2) foot operated switches shall be installed, one (1) on each side on		

the driver and officer's side wired to the air horn(s). **AIR HORN WIRING** The air horns shall be active in both the "Scene" and "Response Mode". **SPEAKER, PASSENGER'S SIDE** There shall be one-(1) speaker shall be installed thru the front face of the bumper, passenger side, outboard. The speaker shall be a Cast Products, 100-watts wired to the electronic siren. **SPEAKER, DRIVER'S SIDE** There shall be one-(1) speaker shall be installed thru the front face of the bumper, driver's side, outboard. The speaker shall be a Cast Products, 100-watts wired to the electronic siren. **FRONT AXLE** The front axle shall be a Meritor MFS-20 with 22,500-pound capacity equipped with oil seals and transparent cover for oil level inspection. **STEERING SYSTEM** The steering system shall be a package certified by TRW for the application. All components after the steering column to the drag link shall be manufactured by TRW. The steering system shall use a TAS-65 steering gear with an RCS-55 slave gear, which has the capacity to static steer the chassis loaded to 22,500 pounds with 425-size tires. The use of two-(2) equal size gears or a single gear with an assist cylinder shall not be acceptable. **FRONT SUSPENSION** The front suspension shall be parabolic (taper leaf) spring type, with four-(4) leaves 22,500 pounds capacity. The leaves shall be a minimum of 4” wide x 54” long (flat), with grease fittings for lubrication installed in the spring pins. Axle stops with energy absorbing jounce bumpers shall be supplied on the spring top pad. Double acting Koni shock absorbers shall be provided on the front suspension.		

FRONT BRAKES The front axle shall be equipped with EX-225 air operated disc brakes and ventilated rotors. **CRAMP ANGLE** The cramp angle of the front axle shall be 41 degrees. **FRONT TIRES** The front tires shall be Goodyear 425/65-R22.5 Load Range "L" G-296 MSA all-weather treads with a capacity of 22,500 pounds. **FRONT WHEELS** The front axle wheels shall be Alcoa Polished Aluminum for 425 tires with a rating of 23,000-pounds. **FRONT WHEEL TRIM** The front axle wheels shall be trimmed with stainless steel hub and lug nut covers. The axle's hub covers shall be equipped with holes for oil level viewing. **MUD FLAPS, FRONT** The front axle mud flaps shall be constructed from hard black rubber and installed behind the front axle. **REAR AXLE** The rear axle shall be a Meritor RS-30-185 with a 31,500-pound service rating. The axle shall be equipped with oil seals. **REAR SUSPENSION** The rear axle suspension shall leaf spring type rated at 31,500 pounds capacity. The main spring pack shall have thirteen (13) leaves with a four (4) leaf auxiliary pack. The suspension shall be a torque leaf, variable rate, self-leveling slipper type. **REAR AXLE DIFFERENTIAL** The Meritor RS series rear axle shall have a standard differential.		

VEHICLE TOP SPEED

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

REAR BRAKES

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

REAR TIRES

The rear tires shall be Goodyear 315/80R22.5 Load Range "J" Regional RHD rocky environment traction treads with a rated capacity of 31,500 pounds.

REAR WHEELS

The rear wheels shall be Alcoa Polished aluminum, 9.00" X 22.5"10-bolt, hub-piloted type. The outside wheels shall be polished on the outer surface. The ground rating shall be a minimum of 33,000 pounds.

TIRE PRESSURE MONITORING SYSTEM

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

REAR WHEEL TRIM

The rear axle wheels shall be trimmed with stainless steel "Lincoln Hat" hub and lug nut covers.

HOSE AND HARNESS ROUTING

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

For ease of maintenance, the wiring harnesses, hydraulic hoses and air hoses shall be divided down each frame rail. The hydraulic and air hoses shall be run, primarily, down the inside of the right side frame rail, while

the electrical harnesses shall be run, primarily, down the left side frame rail. Harnesses and hoses shall be mounted using rubber coated, stainless steel holders and, where necessary, heat resistant zip loom. **AIR BRAKE SYSTEM** The air brake system shall meet the requirements of FMVSS-121. The system shall consist of three-(3) reservoirs with a total capacity of 5100 cubic inches. The system shall be of dual circuit and quick build up design powered by an engine mounted gear driven air compressor. The system shall be protected by a heated air dryer with heated automatic moisture ejector on the wet tank and quarter turn brass drain valves on the other tanks. The system shall be plumbed using color-coded nylon airlines with brass compression fittings. **ANTI-LOCK BRAKES W/ATC & ELECTRONIC STABILITY CONTROL** The apparatus shall have a Wabco ABS-based Electronic Stability Control (ESC), which offers another level of vehicle control. This automatic braking management system reduces the possibility of a side rollover and assists in the directional stability of apparatus. Upon reaching critical lateral acceleration thresholds, the system intervenes to regulate the vehicles deceleration and braking functions. Reducing the engine's RPM by overriding the foot throttle input and applying the engine retarder (if equipped) to slow the apparatus giving the driver added control and maneuverability. The ESC shall also apply braking power to selective wheel of the front and rear axles to assist in stabilizing the apparatus to its intended direction. This selective braking application and reduction of speed and torque reduces the possibility of spinouts and side rollovers even in adverse conditions. The system includes a Wabco 4-channel Anti-Lock Braking System shall be installed which includes four-(4) wheel sensors and four-(4) modulators to control and compensate braking force at each wheel. This system shall monitor all wheel ends regardless of suspension type, and which axle it sees braking forces first. An ABS warning light shall be installed on the driver's dash that remains illuminated until the vehicle is moving at least four-(4) miles per hour. An ABS test switch shall be installed in the "Diagnostic Information Panel" that when pressed, sends the system into diagnostic mode causing the ABS light to blink (I/O) indicating a flash code. A listing of flash code definitions is listed in the Wabco Owner's Manual.		

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

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

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

AIR DRYER

The air system shall include a Wabco System Saver 1200 air dryer with integral 12-volt heated moisture ejector. The air dryer shall have a spin on desiccant cartridge and incorporate an integral turbo cutoff valve. The turbo cutoff allows the air dryer to purge water and contaminants without any loss of turbo boost or engine horsepower.

ENGINE

The vehicle shall be equipped with a Cummins ISL 450 turbocharged diesel engine. Standard features include an electronic governor, electronically controlled unit injectors, Farr air cleaner, a 12-volt starter Delco 39 MT, and an 18.7 CFM compressor. The oil filter shall be a full flow and bypass design.

This engine conforms to the US 2013 EPA regulations for heavy-duty diesel engines.

ENGINE SPECIFICATIONS

- Model: ISL
- Number of Cylinders: Six (6)
- Bore and Stroke: 4.49" X 5.69"
- Displacement: of 8.9 L
- Rated Horsepower: 450 @ 2100 RPM
- Peak Torque: 1250 @ 1400 RPM
- Governed Speed: 2200 RPM

ENGINE COMPRESSION BRAKE The engine shall come equipped with a Jacobs "C-Brake" compression brake controlled by two-(2) switches located in the cab, an on/off and low/medium/high. The compression brake shall interface with the anti-lock brake controller to prevent engine brake operation during adverse braking conditions. A pump shift, interlock circuit shall be provided to prevent the engine brake from activating during pumping operation. **ENGINE COOLING SYSTEM** The engine cooling system shall have the capacity to cool the engine according to the engine manufacture's requirements. **RADIATOR** The engine radiator shall be of a bolted design and have a minimum core area of 1400 square inches. The top and bottom tanks shall be stamped 16-gauge steel. The tanks shall be attached to the header assemblies with a minimum of fifty-(50), 5/16" bolts. The spacing between fasteners shall not exceed 2.00 inches in order to minimize the possibility of leaks. The header plates shall be made of 16-gauge brass while the tubes shall be .0068-inch thick brass and .076 by .625 inches in size. The tubes shall have a smooth bore with welded seems which allows for cleaning of the radiator. The radiator shall contain three rows of tubes with a minimum of 87 tubes per row for a total of not less than 261 tubes. The tubes shall be arranged in an inline profile across the core. Louvered serpentine fins constructed of copper with a density not greater than 16 fins per inch shall be used in the construction of the radiator. The radiator tubes shall be attached to the header plates with a dual bonding process. The coolant side connection shall be welded, while the air side shall be soldered. The top tank shall include an integral de-aeration tank, which removes air from the engine water. A low coolant warning shall be incorporated to alert the driver. The bottom tank of the radiator shall incorporate an oil to water plate-type cooler for the transmission. The cooler is designed to cause a turbulent		

flow of the transmission oil through the core to force heat transfer. The cooler shall be sufficient to cool Allison Transmission without output retarders. A high efficiency fan shall be direct driven by the engine and surrounded by a fan shroud. The sweep of the fan shall not exceed the width of the radiator core. **CHARGE AIR COOLER** The charge air cooler shall be constructed of aluminum with cast, aluminum side tanks. The cooler shall have a frontal core area of not less than 888 square inches. The exterior fins shall be louvered serpentine design constructed of .006-inch thick aluminum and have a density no greater than seven-(7) fins per inch. The internal fins shall be designed to create air turbulence in order to increase heat transfer efficiency. The charge air cooler shall be mounted directly ahead of the radiator and to the radiator headers. Rubber isolators shall be used at the mounting points to reduce transmission of vibrations. The piping between the charge air cooler and engine shall use four-(4) ply silicone woven Nomex hoses with stainless steel bands. The bands are used to maintain the shape of the hose during changing turbo boost pressures. The hoses shall be attached with stainless steel constant tension hose clamps. **COOLING SYSTEM FAN** The engine cooling system shall incorporate a thermostatically controlled fan clutch. When the fan clutch is disengaged, the vehicle shall have improved vehicle performance, cab heating in cold climates, and fuel economy, while eliminating the potential dangers associated with a fan going from non-rotating to rotating as found with other style fan clutches. The fan shall automatically lock-up when the vehicle is placed in pumping mode. A shroud and recirculation shields system shall be used to ensure that once air has passed through the radiator, the same air is not drawn through again. **RADIATOR COOLANT, LONG LIFE**		

The coolant system shall contain a mixture to keep the coolant from freezing to a temperature of -34 degrees F. The coolant supplied shall be Long Life Coolant compatible with the engine manufacturer's requirement. **COOLANT HOSES** The entire chassis cooling system shall have premium rubber hoses. **COOLANT HOSE CLAMPS** All coolant system clamps shall be stainless steel worm drive type clamps. **AUXILIARY ENGINE COOLER** The cooling system shall have a tube and bundle engine cooler mounted in the upper radiator water pipe. Water from the fire pump shall be circulated through 1/2" tubing to the cooler. A valve located on the pump panel shall control the cooling circuit. **ALTERNATOR** The alternator shall be 320 amps Leece Neville model 178-131-100. The alternator shall be engine driven via a poly-groove power belt and tensioned by a threaded rod. The alternator shall meet all current applicable NFPA 1901 Edition requirements for performance. **BATTERY SYSTEM** The battery system shall be a single system consisting of six-(6) Group 31, 12-volt DC, heavy-duty, high cycle automotive batteries. The battery bank shall have a group rating of 3750 cold cranking amperes (CCA) and a reserve of 1,080 minutes at 80 degrees Fahrenheit. All battery wiring shall be "GXL" battery cable capable of handling 125% of the actual load. It shall be run through a heat resistant flexible nylon "HTZL" loom rated at a minimum of 300 degrees Fahrenheit. All cable connections shall be machine crimped and soldered. **BATTERY BOXES** The chassis batteries shall be mounted in welded and bolted stainless steel battery box. The battery hold-downs shall be made of structural, stainless steel angle. Painted carbon steel battery boxes shall not be acceptable.		

BATTERY JUMPER STUDS One-(1) set of battery jumper studs shall be provided on the chassis. The studs shall be connected to the chassis batteries with 1/0 color coded cables, red for the positive cable and black for the negative cable. The studs shall be protected with color coded plastic covers when not being used. A tag shall be provided for positive/negative terminals. The battery jumper studs shall terminate at the front step well area driver's side. **SWITCH, MASTER BATTERY DISCONNECT** The chassis batteries shall be wired in parallel to a single 12-volt electrical system, controlled through a heavy-duty, Guest brand rotary type, master disconnect switch. The master disconnect switch shall be located within easy access of the driver upon entering or exiting the cab. All electrical circuits shall be disconnected when the switch is in the "OFF" position. **TOTAL SYSTEM LOAD MANAGER W/HIGH IDLE** The apparatus shall be equipped with a Class 1 Total System Manager (TSM) for performing electrical load management. The TSM shall have two-(2) modes of operation, a "Calling Right of Way" and a "Blocking Right of Way". The "Blocking Right of Way" mode is activated only when the park brake is set. Load shedding shall "only" occur when the apparatus is in the "Blocking Right of Way" mode or when the battery voltage level reaches your programmed shed level. Outputs 1-12 shall be independently programmable to sequence on with the ignition or master warning switch. Outputs 1-12 shall also be programmable to be activated during the "Calling Right of Way" mode and or the "Blocking Right of Way" mode. Output 13 is user configurable output and is programmable for activating between 10.5 and 15 volts. Output 14 shall provide a low voltage warning for an isolated battery. Output 15 shall be designated to activate a fast idle system. Output 16 shall provide a low voltage alarm that activates at the NFPA required 11.8 volts. The Total System Manager shall have an internal digital display to indicate systems voltage is in normal operation mode and indicates the output configuration during programmable mode. The Total System Manager shall be protected against reverse polarity and		

shorted outputs, and be enclosed in a metal enclosure to enhance EMR/RFI protection.

ON-BOARD ELECTRICAL AIR COMPRESSOR PUMP PLUS CHARGER

A system shall be installed that automatically charges the chassis air and electrical system.

AIR COMPRESSOR

The small on-board air compressor shall be mounted on the vehicle to maintain the air pressure in the air brake system while the vehicle is not in use. A pressure switch shall sense the system pressure and operate the compressor whenever the pressure drops below a predetermined level.

SPECIFICATIONS

Input:	12 volts @ 11 amps maximum
Output:	.30 SCFM @ 80 PSI, .35 SCFM @ 60 PSI
Motor Type:	Permanent Magnet .10HP
Pressure Switch:	Adjustable set-Point (Factory set to 75 PSI cut in, 95 PSI cut out)

BATTERY CHARGER

The on-board automatic battery charger shall be mounted in the vehicle to maintain the chassis electrical system.

The Pump Plus 1200 charger senses battery voltage drop and recharges the batteries to full capacity. The state of charge is indicated on a remotely located bar graph display whenever power is applied to the vehicle. The battery saver contained in the Pump Plus 1200 charger is a three-(3) amp power supply with a relay to remove the accessory loads from the battery and connect them to the power supply when the charger is energized with AC power. This shall permit the charger to recharge the batteries without supplying the accessory load.

A selector switch shall be provided on the charger to operate the compressor either as a DC compressor or as an AC compressor. In either switch position, the compressor shall operate from the vehicle battery. When the DC position is selected, the compressor shall operate whenever the pressure switch senses low system pressure so that the vehicles air system can be charged when the vehicle is away from a 120 volt AC source. When the department wishes to limit compressor operation only when the vehicle is connected to the 120-volt AC source, the switch

should be place in the AC position.

SPECIFICATIONS

Input:	120 volts, 60 Hz, 10 amps
Output:	12V DC, @ 15 amps
Battery Charger:	12 volts DC @ 40 amps
Battery Saver:	12 volts DC @ 3 amps
Voltage Sense:	Remote Electronic

Indicators:

- Power - Indicates input power applied
- Battery Saver - Indicates Battery Saver load exceed 3 amps
- Bar Graph - Remotely located indicates state of charge of batteries

20 AMP SUPER AUTO-EJECT(S)

There shall be provided one (1) super auto-eject type receptacle(s) model 091-55-20. A solenoid wired to the vehicle starter is energized when the engine is started. This instantaneously drives the plug from the receptacle. The receptacle shall be provided with a weatherproof cover. The cover shall be spring loaded to close, preventing water from entering when the shoreline is not connected. The super auto eject receptacle shall be mounted in a location specified by the department and is designed to accept a 120V AC from a shoreline plug.

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

The Air Eject cover(s) shall be a Kussmaul 091-55YW, yellow in color.

SHORE POWER INLET PLATE

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

The plate shall indicate the following:

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

TRANSMISSION The chassis shall be equipped with an Allison 3000 EVS automatic transmission. It shall have 4th gear operating controls and programmed for Fire Apparatus vocation. An electronic oil level indicator shall be provided as well as a diagnostic reader port connection. The transmission shall be geared to provide one-to-one ratio in fourth gear for fire pump applications. This dedicated "lockup" circuit is provided for pump operation. The transmission fifth gear shall be an overdrive ratio, permitting the vehicle to reach its top speed at the governed engine speed. The transmission shall be equipped with an automatic neutral feature. Applying the parking brake shall command the transmission to neutral, regardless of drive range requested on the shift selector which shall require re-selecting the drive range to shift out of neutral. The transmission shall be equipped with dual PTO ports with engine speed capabilities. The transmission shall be cooled by the radiator-mounted heat exchanger. The transmission fluid shall meet Allison specification TES-295. **TRANSMISSION SHIFTER, PUSH BUTTON** The transmission shall be controlled by an Allison push button shifter internally illuminated for night operation. The shifter shall be mounted on the dash to the right of the steering column. The transmission shall be capable of five-(5) speed operation. The transmission shall be equipped with the oil level sensor (OLS); this sensor shall allow the operator to obtain an indication of the fluid level the shift selector. The sensor display shall provide the following checks, correct fluid level, low fluid level and high fluid level. **DRIVELINES** The chassis shall be equipped with Neapco 1710 series driveshaft with full round yokes and universal joints. The driveshaft tubing shall be a minimum of 4.00" diameter with .134" wall thickness. The drivelines shall be balanced at a minimum of 3000 RPM. **FIRE PUMP MOUNTING** Extra heavy-duty mounting brackets shall be bolted to the chassis frame rails for the installation of the fire pump. The mounting brackets shall be positioned aligning the pump insuring the angular velocity of the driveline		

joints are the same at each end allowing for full capacity performance with minimal vibration. **FUEL TANK** The chassis shall be equipped with a 65-gallon rear mounted fuel tank. The tank shall be constructed of 12-gauge steel with stainless steel mounting straps and rubber isolators secured to the bottom flange of the chassis frame rails. The tank shall be baffled to prevent sloshing, vented, and have a drain plug installed on the bottom. A 240-33 ohm fuel-sending unit shall be provided and broadcast across the SAE J1939 data link. The tank shall be certified to meet FMCSR 393.65 and 393.67. **FUEL LINES** The fuel lines shall be wire braid reinforced fuel grade hose. They shall have reusable fittings and be routed along the inside of the frame rails. Fuel lines shall be protected against chaffing by non-conductive, frame mounted standoff fasteners and, where necessary, with heavy-duty plastic zip loom. **FUEL SHUTOFF VALVE(S)** One (1) fuel shutoff valve(s) shall be installed in the suction side of the fuel lines near the fuel filters to prevent the loss of prime during fuel filter maintenance. **FUEL FILTER** The Cummins engine shall be supplied with a fuel water separator with a bottom drain valve. **UREA STORAGE TANK** There shall be a 5-gallon urea tank located in the L1 body compartment. The L1 compartment door shall serve as the access door for filling this tank. There shall be a urea level gage located in the cabs main instrument panel. **EXHAUST SYSTEM** The apparatus shall contain a particulate filter and SCR (Selective Catalytic Reduction) device downstream of the engine's turbo. This filter and SCR device are required to maintain US 2010 EPA Emissions. This filter and SCR device replaces the conventional style filter. The location		

has been engineered, tested, and set to allow for proper regeneration. Therefore, this filter cannot be removed, altered, or relocated. An indicator light panel for this system shall be located in the cab informing the driver of the systems status. At times a forced regeneration may be required, which would be indicated by a combination of illuminating and/or flashing lights depending on the engine model. A momentary switch labeled "Regen" shall be located within reach of the driver's seated position. The regeneration switch initiates the forced regeneration. A momentary DPF inhibit switch prevents the vehicle from having the ability to regenerate. Once the inhibit feature has been activated the ignition switch must be cycled off/on to return the vehicle to normal regen. All vehicles equipped with pumping applications shall allow for passive regeneration whenever the system requires and the engine is at its proper parameters unless inhibited by the DPF inhibit switch. In no way shall this feature affect the RPM of the engine being controlled by the pump operator. The engine exhaust system shall be horizontal in design using stainless steel tubing mounted under the frame rail right side extending forward of the rear wheels. An exhaust temperature mitigation device shall be installed. The temperature mitigation device shall lower the temperature of the exhaust by combining ambient air with the exhaust gasses at the exhaust outlet. **CUSTOM CAB** The cab shall be an engine forward, long four-door, (raised roof) full tilt cab. The cab shall be an "Open Interior" roll cage design requiring no inner walls or vertical interior supports. The cab roof shall be raised 8 inches providing additional headroom above the crew area. The raised portion shall start midway over the driver and officer seats. The cabs seating capacity for emergency personnel shall be eight. All storage areas inside the cab shall fully comply with NFPA 1901 restraint requirements of 9G’s. **CRASH TEST** The cab shall exceed the strict and detailed requirements of the Economic Commission for Europe Structural Standard, ECE-29R. The test shall consist of an impact load test and a vertical load test to the cab. The cab shall have a frontal impact tests via pendulum, with an impact		

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

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

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

CAB MATERIALS

The cab shall be constructed entirely of aluminum alloy extrusions and 3/16" (.188) thick, 5052-H32 alloy, marine grade aluminum sheets. The corner posts, door slam posts, roof rails and doorframes shall be made of custom extrusions designed specifically for this cab with slots for inserting the skin. The rear wall and roof shall be reinforced with a grid of rectangular extrusions, which are welded to the overall cab extrusion framework. The front corner caps shall consist of castings designed specifically for this cab with relief areas cast in place for attachment of roof skin and intersecting structural extrusions. Overlapping formed corner caps are not acceptable.

CAB DIMENSIONS

- Overall width skin to skin: 96 inches
- Overall vehicle width: 116 inches (w/standard mirrors)
- Overall length: 142 inches
- Cab Height Front: 87 inches
- Cab Height Rear: 95 inches
- Center of front axle to back of cab: 68 inches (lower section notched back 54 inches)
- Windshield area: 4100 square inches
- Front grill opening: 430 square inches
- Side grill opening: 105 square inches
- Cab full tilt angle: 45 degrees
- Cab full tilt height: 191 inches
- Floor to ceiling in front: 60 inches

- Floor to ceiling in rear: 66 inches
- Engine cover height: not to exceed 27-1/2" front-to-back and side-to-side
- The Driver shall have no less than 24-1/4" of hip room
- The Officer shall have no less than 23-1/4" of hip room

DOUBLE WALL CAB FACE

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

SEALED ENGINE TUNNEL

The engine tunnel shall be a structural part of the passenger cab, constructed from welded 3/16” aluminum plate and reinforced with aluminum extrusions. The rear of the engine tunnel shall be no less than 63” inches from the rear wall of the cab, allowing maximum legroom for forward facing passenger. After welding, the seams shall be completely sealed with silicone caulking.

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

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

CAB FLOORS

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

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

The entire rear floor of the cab, to reduce trip and fall hazards, shall be a single plane. In applications requiring the use of a top-mounted PTO, a raised area in the floor may be required. For maximum crew comfort and eliminate leg fatigue during emergency responses, the floor beneath the rear facing jump seats shall be large enough for a seated firefighter to rest both feet side-by-side. Cab floor designs that are wide enough for only one foot shall not be accepted. **CAB CORROSION PROTECTION** A corrosion preventative material shall be applied during cab construction. A ten-(10) year warranty against corrosion perforation shall be provided for the cab. **WHEEL WELL LINERS** Full wheel well liners shall be installed beneath the cab to protect the bottom of the cab from road splash. The liners shall be constructed of aluminum and be full width. The wheel well liners shall be attached with threaded fasteners and be easily removable for service. **FENDERETTES** Bright polished stainless steel fenderettes shall be installed at the wheel well openings. A rubber gasket shall be installed between the fenderette and cab to eliminate contact of dissimilar metals. **WINDSHIELD** The windshield shall have approximately 4100 square inches of unobstructed viewing area. It shall be a two-(2) piece design with tinted automotive safety glass, with a wraparound design. A .030-inch thick vinyl layer shall separate the laminated glass. All other cab glass shall be tinted and tempered. **INTERMITTENT WINDSHIELD WIPERS** Two electric "Pantograph" style windshield wipers shall be installed on the front face of the cab. The motors shall operate through a 72-degree sweep and include 24-inch blades to give superior wiper coverage. A washer reservoir of not less than 70 ounces shall be mounted a latched door recessed in the officer's step.		

A switch located on the turn signal control arm shall operate the intermittent wipers. **EXTERIOR GRAB HANDLES** Stainless steel handrails with a knurled, slip-resistant finish shall be positioned behind each cab door. Grab rails shall be minimum 24" in length. Molded rubber gasket shall be mounted between the grab handles and the cab in order to prevent corrosion due to dissimilar metals being in contract. **EXTREME DUTY CAB INTERIOR** Cab floors shall be covered with a pebble grain rubber matting with barrier type insulation. Edges of the insulation shall be trimmed with extruded aluminum angle for a pleasing appearance. An insulated covering shall be fitted over the engine tunnel. Made from the same material as the cab floor insulation, this covering shall insulate the cab from engine heat and noise. A Cast Products aluminum door on top of the engine tunnel shall provide access for fluid checks. The back side of the engine cover, as well as a 2" to 3" return on the top side, shall be covered with a sprayed aluminum panel and be of sufficient strength to allow for 9G resistant mounting of any optional hand lights, entry tools, or other fire rescue equipment specified by the customer. The cab shall have a custom built, smooth aluminum plate dashboard, overhead console, glove box, instrumentation panel and switch panel. The front overhead shall include room for the three sun visors and the door open indicator light. The front door posts shall be trimmed with styled aluminum covers that conceal any wiring, as well as including a mounting area for rubberized grab handles. The center windshield post shall be covered F-Shield paint finish. Prior to installing the headliner and rear wall panel, minimum R-7 insulation, shall be installed between the interlocking extrusions. These covers serve to finish the interior, cover wiring harnesses and insulate the interior from sound and heat. **SUN VISORS**		

The cab shall be equipped with a minimum of three (3) sun visors. The visors shall be installed on the overhead panel and provide approximately 90 per cent coverage across the width of the cab. The visors shall be approximately 26 inches wide and six (6) inches tall. **GLOVE BOX** The glove box shall be an integral part of the welded aluminum dashboard assembly and located on the officer side of the cab. The storage area of the glove box shall bolt in place for easy service access. The door shall be drop down style and constructed from brushed stainless steel with a recessed latch. The area above the glove box shall be flat for a work surface or optional MDT mounting. **CAB STEPS** All cab steps shall be of a stationary, fixed design that use no moving parts and requires no periodic maintenance other than cleaning. There shall be an open-grip, bright finish step at each cab door opening. The area under the step shall be enclosed to prevent road dirt from entering the cab. There shall be provisions made at the front of the step for easily flushing out any dirt accumulation. At each door, opening there shall also be an intermediate cab step. Intermediate steps shall be full width of the doorstep area and constructed from embossed aluminum tread plate. **CAB STEP HEIGHTS** The distance from level ground to the first cab step shall be 19-21 inches (24” with Independent Front Suspension), without using swing-down style or under-cab “stirrup” auxiliary steps. The distance from first cab step to intermediate step shall be approximately 12.5 inches front and rear. The distance from intermediate step to cab floor shall be approximately 9.5 inches in the front and 12 inches in the rear. **CAB DOORS** All cab doors shall be full length, designed to cover the step well area. Each cab door shall be flush type with a minimum opening of 85 degrees. The front doors shall be approximately 40" inches wide by 78.5" inches		

tall. The doors shall have a two-piece window, one operational and one fixed. The combined viewing area shall be no less than 796 square inches. For added safety, the front door windows shall slant down for maximum visibility. The rear doors shall be approximately 34" inches wide by 86.5" inches tall. The doors shall have a two-piece window, one operational and one fixed. The combined viewing area shall be no less than 867 square inches. There crew area windows shall have a dark tint applied. The doors shall include a bulb style rubber seal around the perimeter of each door frame ensuring a weather tight fit. The cab doors shall use internal and external paddle latches with a rubber gasket isolating the latch from the painted outside surface. The external latch shall have a chrome plated finish and the interior stainless steel. Both latches shall be oversized for easy access with a gloved hand. Dovetail catch assemblies shall be installed in the doorjamb. The dovetail catch shall be V-shaped providing a positive catch and release system. **DOOR HINGES** Each cab door shall be attached to the cab with two concealed automotive style hinges with restraining strap. **CAB DOOR LOCKS** There shall be individual manual twist type door locks at each door handle. In accordance with FMVSS 206, all exterior door locks shall be keyed alike. **WINDOW REGULATORS** All cab door windows shall be electrically operated. The driver's door shall contain four-(4) switches to control the operation at each door. All remaining doors shall contain one-(1) heavy-duty switch to control the window operation at that door. **FIXED CAB WINDOW, LEFT SIDE** A window of not less than 16-1/2" wide by 25-1/2" high shall be installed in the left sidewall of the cab between the front and rear door. The glass shall be tempered and retained with one-piece triple locking rubber lacing dark tint.		

FIXED CAB WINDOW, RIGHT SIDE A window of not less than 16-1/2" wide by 25-1/2" high shall be installed in the right sidewall of the cab between the front and rear door. The glass shall be tempered and retained with one-piece triple locking rubber lacing dark tint. **CAB TILT LOCK** The cab shall be supported at four points. At the front, there shall be two center bonded bronze bushings. At the rear, there shall be two hydraulic locking latches. The cab shall tilt 45 degrees by means of a pair of hydraulic cylinders driven by the electric pump. The tilt system geometry shall be designed in such a way that the maximum hydraulic pressure in the system does not exceed one-half the pressure rating of the cylinders or pump when the cab is empty. This allows the Fire Department to leave some equipment in the cab when maintenance is required (although this equipment must be secured). Once the cab is fully tilted, a safety latch shall automatically engage and act as a positive lock. The lock is released by a pull cable. The hydraulic cylinders shall be equipped with velocity fuses to prevent the cab from falling, should the hydraulic system fail. The front of the cab pivots and rides on the center bonded bushings by means of lubricated pivot pins that retain the cab yoke in the bushings. The bushings allow limited movement of the cab, and isolate the cab from noise and vibration. The rear mounts consist of a pair of hydraulic cab latches mounted on rubber cushioned mounting brackets. Latches release when the pressure in the tilt system exceeds 500 PSI. An ignition interlock system shall be installed for cab tilt operation. Cab tilt operation requires the master battery switch to be in the on position with the parking brake applied. **CAB TILT PUMP W/MANUAL BACKUP** An electric over hydraulic cab lifting pump shall be provided to tilt the cab for engine and transmission service. The pump shall be operated by a remotely wired control box with coiled cord, weather resistant plug, and receptacle. An interlock shall be provided preventing the cab from inadvertently rising until the transmission is placed in the neutral position		

and the parking brake is set. In the event of electrical failure, a hydraulic manual backup shall be provided to tilt the cab. The backup pump shall be remote mounted in a location determined by the Fire Department. **COMPARTMENT, PIKE POLE STORAGE** There shall be one-(1) compartment located under the rear cab extension with the capacity to hold two-(2) pike poles. The compartment shall be access through a hinged stainless steel door on each side of the apparatus. **CAB PAINT FINISH, TWO TONE** The custom cab shall have a two-tone paint finish. The paint colors shall be furnished by the customer. The break in the color shall be at the bottom of the chassis window, unless otherwise specified by the department. All cab exterior components including doors and glass, shall be removed. The complete cab exterior shall be thoroughly sanded, solvent cleaned and finished with high luster polyurethane paint before mounting of body to assure full coverage of paint to all surfaces. **UPPER CAB PAINT FINISH** The upper cab exterior shall have no mounted components prior to painting to assure full coverage of metal treatments. These steps are followed as recommended by the paint manufacturer to provide a lasting and high quality gloss finish. All paint products shall be provided by DuPont. **UPPER CAB PAINT COLOR/CODE** The upper cab paint code shall be White, 854064. **PRIMARY/LOWER CAB PAINT FINISH** The primary/lower cab exterior shall have no mounted components prior to painting to assure full coverage of metal treatments. These steps are followed as recommended by the paint manufacturer to provide a lasting and high quality gloss finish. All paint products shall be provided by DuPont. **PRIMARY/LOWER CAB PAINT COLOR/CODE**		

The primary/lower cab paint code shall be Red, 3516.

LIGHTED FRONT GRILLE

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

SIDE INTAKE GRILLES W/EMBER SEPARATOR

Bright stainless steel grilles shall be installed approximately 70" above ground level one-(1) each side cab between the front and rear cab doors. The grilles shall have a minimum open area of not less than 119 square inches serving as an air intake and warm air dispersant system.

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

HEATED/REMOTE CAB MIRRORS

Two cab mounted Ramco heated/ remote single lens mirrors, with bus style arms shall be installed on the cab front corners. The convex mirror shall be mounted above the flat lens assembly.

EXTERIOR TRIM, REAR CAB STEP WELL

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

TREAD PLATE BACK OF CAB

The entire back wall of the cab shall be covered with 1/8" (.125") thick aluminum tread plate. The tread plate shall be coated with a rust inhibitor and fastened to the cab with stainless steel fasteners. A bead of caulking shall be applied to the perimeter of the tread plate.

INTERIOR CAB FINISH

The interior of the cab shall be painted with a dark gray “F-Shield”. The

cab metal finish shall be covered with a coat of adhesion promoting primer. "F-Shield" is a 100% solids, state-of-the art, VOC-free, plural-component, pure polyuria elastomeric membrane. This seamless system exhibits extraordinary performance characteristics. F-Shield is based on amine-terminated polyether resins, amine chain extenders and MDI pre-polymers. This membrane achieves an extremely tough, flexible, chemical and abuse resistant finish. F-Shield shall be used in specified areas for maximum protection. The headliner (front and rear) and rear wall (if applicable) shall be covered with heavy-duty gray vinyl. **FLOOR MATS/ENGINE TUNNEL COVERING** The floor mats and engine tunnel shall be covered with black pebble grain vinyl with 1/4" (.250") foam backing. The edges of the floor mats shall be trimmed with bright aluminum angle. **INTERIOR TRIM, REAR WALL ALUMINUM PANAL** The entire interior rear wall of the cab shall be covered with 3/16" (.1875") smooth aluminum plate coated with "F-Shield". "F-Shield" is a 100% solids, state-of-the art, VOC-free, plural-component, pure polyuria elastomeric membrane. This seamless system exhibits extraordinary performance characteristics. F-Shield is based on amine-terminated polyether resins, amine chain extenders and MDI pre-polymers. This membrane achieves an extremely tough, flexible, chemical and abuse resistant finish. F-Shield shall be used in specified areas for maximum protection. The color of the rear wall panel shall match the interior of the cab unless otherwise specified. **CAB GRAB HANDLES, INTERIOR** Two-(2) interior grab handles installed in the cab on the "A" posts, one-(1) each side. The grab handles shall be constructed of rubberized steel. Four-(4) interior grab handles installed in the cab, one-(1) each side on top of the front door panels adjacent to fixed window and one-(1) each side on the rear door panels. The grab handles shall be constructed of 1-1/4" knurled stainless steel. The gab rails shall be mounted with chrome plated end stanchions.		

There shall be one-(1) interior grab handle installed on the inside of each rear cab door. The handles shall extend horizontally with width of the window just above the window sill. The grab handles shall be constructed of bright stainless steel. **UPPER DOOR PANELS** There shall be four-(4) interior upper front and rear door panels installed covered with "F-Shield" extending from the window down to the lower kick plate. The color of the panels shall match the interior of the cab unless otherwise specified. "F-Shield" is a 100% solids, state-of-the art, VOC-free, plural-component, pure polyuria elastomeric membrane. This seamless system exhibits extraordinary performance characteristics. F-Shield is based on amine-terminated polyether resins, amine chain extenders and MDI pre-polymers. This membrane achieves an extremely tough, flexible, chemical and abuse resistant finish. F-Shield shall be used in specified areas for maximum protection. **LOWER DOOR PANELS** There shall be four-(4) interior lower front and rear door panels installed covered with "F-Shield" extending from the window down to the lower kick plate. The color of the panels shall match the interior of the cab unless otherwise specified. "F-Shield" is a 100% solids, state-of-the art, VOC-free, plural-component, pure polyuria elastomeric membrane. This seamless system exhibits extraordinary performance characteristics. F-Shield is based on amine-terminated polyether resins, amine chain extenders and MDI pre-polymers. This membrane achieves an extremely tough, flexible, chemical and abuse resistant finish. F-Shield shall be used in specified areas for maximum protection. **REFLECTIVE STOP SIGNS** There shall be four-(4) "STOP" signs installed in the cab, one-(1) on the lower door panel of each cab door. **INSTRUMENTATION** For easy viewing, gauges shall be white faced with black lettering and adjustable intensity, green LED backlighting. In order to reduce replacement and maintenance costs, the gauges provided shall be separate		

from one another and not in a cluster or arrangement. The gauges shall meet SAE J-1939 protocol to eliminate redundant sending units. Gauges must be fully sealed to 6 psi. Gauges shall have an operating temperature range of -40F to 185F. The gauge crystal shall be polycarbonate, anti-fog, and anti-scratch coated. The panels shall be divided into groups of instruments that make identification sensible and easy to view.

The following panels shall be included:

- One driver side hinged gauge panel
- One driver side message center and indicator light panel
- Driver side pump shift panel (if required)
- Driver side park brake panel
- Driver side diagnostic connector
- Driver side ignition/climate control panel
- Center mounted rocker switch and siren panel, with a maximum capacity of 20 switches
- Officer side information panel

The following instruments shall be included:

- Dial Type speedometer with digital odometer and trip odometer that is active when pumping
- Dial Type tachometer with digital hour meter and trip hour meter along with a digital, four-line diagnostic display
- Dial Type engine oil pressure gauge with warning light and alarm
- Dial Type water temperature with warning light and alarm
- Dial Type transmission temperature with warning light and alarm
- Dial Type front air pressure gauges with warning light and alarm
- Dial Type rear air pressure gauge with warning light
- Dial Type voltmeter
- Dial Type fuel level gauge with low fuel indicator level
- Dial Type Diesel Exhaust Fluid gauge with low level indicator
- Air cleaner restriction light
- High beam indicator
- Parking brake indicator
- Turn signal indicators
- Diagnostic indicators for airbag, engine, transmission, and ABS

An anti-lock braking system (ABS) test switch and parking brake control valve shall be located to the right of the steering column.

SERVICE ACCESS

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

The chassis electrical panel shall be located in the center of the aluminum dash, between the switch panel and the windshield. There shall be a lift up cover, with two (2) recessed lift-and-turn latches for quick access to the panel. The underside of the panel shall have a pre-printed diagram that clearly depicts the function of each circuit breaker and relay. The vehicle load manager shall be located in this panel. The opening to the electrical shall measure approximately 19” wide near the switch panel and 37” wide toward the windshield.

Electronic diagnostic connections for the engine, transmission, and ABS brakes shall be located in the lower-left panel on the cab dash.

DRIVER’S INFORMATION DISPLAY

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

- Auto Self-Test
- Viewing the state of each digital or analog input to the unit
- Viewing the state of each output
- Allows users ability to set service reminders by distance or hours of operation
- Allows users ability to set data screens in various formats i.e. bar graph / text
- Viewable active and stored powertrain ECU fault data.
- Diagnostics screen allows user to select and view a specific source such as engine / transmission
- Display is selectable between English and metric readings.
- Messages and Icons will pop up in display when a condition exists such as:

Transmission oil life, filter or other service needed as reported by the Allison Transmission ECU

Engine conditions: Low oil pressure, high coolant temperature,

low coolant level, water in fuel, check / stop engine, regeneration needed, high exhaust temp

Indicator lights may also accompany pop up messages:

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

CHASSIS ELECTRICAL SYSTEM

The chassis shall include a single starting electrical system which shall include a 12 volt direct current system, suppressed per SAE J551. The wiring shall be appropriate gauge cross link with 311 degree Fahrenheit insulation. All SAE wires in the chassis shall be color coded and shall include the circuit number and function where possible. The wiring shall be protected by 275 degree Fahrenheit minimum high temperature flame retardant loom.

CHASSIS COLOR CODED WIRING

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

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

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

MAIN CENTER DASH

The main center dash area shall include three (3) removable panel's located one (1) to the right of the driver position, one (1) in the center of the dash and one (1) to the left of the officer position. The center panel shall be within comfortable reach of both the driver and officer. The panel shall be constructed of 5052-H32 Marine Grade, 1/8 inch thick aluminum plate.

The left dash panel shall include ten (10) switches. There shall be eight (8) switches across the top of the panel and two (2) staggered on the lower portion of the panel. The transmission shifter and instrument lamp dimmer control shall be provided on the right side of the panel.

The center dash panel shall include lighted rocker switches with a legend. The non-specified switches shall be two-position, black switches with an indicator light. All switch legends shall have backlighting provided. The center portion shall be used for electronic siren mounting. The right dash panel shall be blank. **VEHICLE DATA RECORDER** Apparatus shall be equipped with a Class1 "Vehicle Data Recorder and Seat Belt Warning System" (VDR/SBW) that is connected to the power train CAN (Controller Area Network) bus consisting of transmission (TCM), engine control (ECM) and antilock brake (ABS) modules mounted on the apparatus. The VDR/SBW will function per NFPA 1901-2009 sections 4.11 (Vehicle Data Recorder) utilizing the power train's J1939 data and 14.1.3.10 (Seat Belt Warning) using the Class1 "Seat Belt Input Module" for seat occupied and belt status information. The VDR data shall be downloadable by USB cable to a computer using either Microsoft™ or Apple™ Operating Systems using Class 1/ O.E.M. supplied reporting software. There shall be a seat belt indicator system supplied in the cab. The indicator system shall indicate seat belt use for each individual seating position when the seat is occupied, the seat belt remains unfastened and the parking brake is released. A display panel shall be supplied in the dash area. The panel shall have an audible indicators and a red light display to indicate that a seat belt has not been fastened. **SEAT BELT WARNING SYSTEM** Mounted in the overhead console in the driver's area the indicator system shall indicate seat belt use for each individual seating position when the seat is occupied, the seat belt remains unfastened and the parking brake is released. **STEERING COLUMN** The steering column shall be a Douglas Autotec tilt and telescope. A lever mounted on the side of the column shall control the tilt and telescope features. A Signal-Stat (self-canceling) turn signal switch shall be mounted to the column. The steering shaft from the column to the meter box shall have a rubber boot to cover the shaft slip and a second rubber boot to seal the passage hole in the floor.		

The steering wheel shall be 18 inches in diameter.

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

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

FRONT CIRCULATION FANS

Two (2) 6" circulation fans shall be mounted on the front overhead console, one (1) for driver and one (1) for officer side of the vehicle.

HEATING/AIR CONDITIONING SYSTEM

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

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

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

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

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

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

The air conditioning system shall be powered through two (2) engine

driven 9.5 cubic inch compressors. Two (2) roof top condensers, each rated at 38,700 Btu, shall be provided. The two-(2) roof top condenser housings shall be white in color. **SEAT MATERIAL** The seats shall be covered with Durawear material. **SEAT COLOR** The cab seats shall be gray in color. **DRIVER'S SEAT** The driver's seat shall be a Bostrom Model Sierra high-back with air ride suspension. The seat shall have 4-way adjustability by the driver in accordance with SAE J1517. The seat shall be equipped with an integrated 3-point seat belt with an automatic retractor. The belt shall be red in color to meet current NFPA requirements. **OFFICER'S SEAT** The officer's seat shall be a Bostrom Tanker 450 SCBA non-suspension. Seat back shall include a spring-loaded flip-up headrest. The seat shall be equipped with an integrated 3-point shoulder harness with lap belt and an automatic retractor built into the seat assembly. The belt shall be red in color to meet current NFPA requirements. There shall be a SecureAll auto lock SCBA holder provided with the seat. The SCBA holder shall have an integrated one-touch release handle located centered below the seat cushion. The SecureAll system meets NFPA 1901 standards and requirements of EN 1846-2. **OFFICER'S SEATBASE COMPARTMENT** There shall be a compartment provided under the officer's seat for additional storage. The compartment shall have a hinge door with latching mechanism. **CREW SEAT, DRIVER'S SIDE REAR FACING** One-(1) outboard, rear facing, seat shall be installed behind the driver. The seat shall be Bostrom Tanker 450 SCBA non-suspension seat. The seat back shall include spring-loaded flip-up headrest. The seat shall be equipped with 3-point seat belt with automatic retractor. The belt shall be		

red in color to meet current NFPA requirements. There shall be a SecureAll auto lock SCBA holder provided with the seat. The SCBA holder shall have an integrated one-touch release handle located centered below the seat cushion. The SecureAll system meets NFPA 1901 standards and requirements of EN 1846-2. **CREW SEAT, OFFICER'S SIDE REAR FACING** One-(1) outboard, rear facing, seat shall be installed behind the officer. The seat shall be Bostrom Tanker 450 SCBA non-suspension seat. The seat shall include a spring-loaded flip-up headrest. The seat shall be equipped with a 3-point seat belt. The belt shall be red in color to meet current NFPA requirements. There shall be a SecureAll auto lock SCBA holder provided with the seat. The SCBA holder shall have an integrated one-touch release handle located centered below the seat cushion. The SecureAll system meets NFPA 1901 standards and requirements of EN 1846-2. **CREW SEATS, INBOARD FORWARD FACING** Two-(2) inboard, forward facing seats shall be installed in the crew area. The seats shall be Bostrom Tanker 450 SCBA non-suspension seats. Seat backs shall include spring-loaded flip-up headrest. The seat shall be equipped with a 3-point seat belt. The belts shall be red in color to meet current NFPA requirements. There shall be a SecureAll auto lock SCBA holder provided with each seat. The SCBA holders shall have an integrated one-touch release handle located centered below the seat cushion. The SecureAll system meets NFPA 1901 standards and requirements of EN 1846-2. **CHARGING PORT(S), 12-VOLT DUAL USB** There shall be one (1) Kussmaul model 019-219, 12-volt USB dual charging port(s) provided in the cab. The charging port(s) shall be equipped with one-(1) 1.0 amp connection and one-(1) 2.1 amp connection with built in LED indicator that indicates when the device(s) are powered. The charging port(s) shall be wired to direct battery power with the appropriate wire size and fuse. The charging port(s) shall be located in the emergency switch panel.		

RADIO POWER CIRCUIT A 50 amp switched battery power circuit with manual reset shall be installed behind the officer's seat to activate the radio. **12-VOLT POWER OUTLET(S)** There shall be two (2) 12-volt power outlets provided in the cab. The power outlet(s) shall be wired to direct battery power with the appropriate wire size and fuse. **ELECTRONIC SIREN** There shall be one (1) Whelen model WS295SLSA1 hands free siren provided. The siren amplifier and control panel shall be assembled as a single unit. The siren shall incorporate a rotary selector for six siren functions. There shall be an on/off power switch; a push button switch for manual siren or air horn tones, a noise-canceling microphone with volume control, mechanical Executer sound and a horn ring override control. The unit shall be mounted in the cab. **BACK-UP ALARM** There shall be one-(1) electronic back-up alarm installed at the rear of the apparatus. The alarm shall be wired to the transmissions output signal and is automatically activated when the transmission is shifted into reverse. **LIGHTS, CAB DOME** Four-(4) combination clear/red LED dome lights with one-(1) piece bezels shall be installed in the cabs headliner. The push on / push off switches for the clear and red dome lights are integrally mounted in the dome lights lens. The white LED lights shall be activated when any cab door is in the open position automatically switching off all red lights currently on and reactivated when the door is closed. **LIGHT, DOOR AJAR** A Whelen model TIR3 door ajar light shall be located on the cab's ceiling. This light shall be a self-contained flashing light that activates when any of the apparatus doors are open. The lens color shall be red. An audible alarm shall be installed in conjunction with the door-ajar warning light system. The panel only operates when the ignition switch is		

in the "On" position and the parking brake released. **LIGHTS, STEP WELL** Four-(4) Whelen OS Series LED model 0SC0EDCR shall be provided, one-(1) in each cab step well. All step well lights shall be illuminated when any door is opened. The steady burn illumination light shall incorporate three clear LED and a clear non-optic hard coated polycarbonate lens. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The encapsulated assembly shall provide protection against environmental elements. The solid state illumination light shall be vibration resistant. An installation kit including mounting hardware, neoprene gasket and 45 degree angle chrome housing shall be provided for surface mounting. The 0AC0EDCR will contain a 12" non-terminated pigtail. The illumination light meets SAE J592 requirements and is covered by a five year factory warranty. **LIGHTS, ENGINE MAINTENANCE** Two-(2) white 4" LED round lights shall be mounted under the cab. The lights shall automatically activate when the cab is tilted. **STANDARD FRONT LIGHTING** The headlamps, turn signals, front warning, and intersection lights shall be located within chrome warning light modules. **HEADLIGHTS** Four-(4) halogen rectangular headlights shall be installed in the warning light modules, two-(2) each side. The headlights shall be mounted in the lower positions of the module. **DAYTIME RUNNING LIGHTS** The apparatus shall be equipped with Daytime Running Lights. This feature shall control 80% of the low beam headlamp illumination. The Daytime Running lights shall operate only when the ignition switch is in the "On" position and the parking brake is released. The headlight circuitry shall override the Daytime Running Lamp feature when the headlight switch is in the "On" position. The vehicle identification lamps shall not illuminate in the Daytime Running Lamp mode. **TURN SIGNALS** Whelen model M6T amber LED turn signal lamps shall be installed		

directly above the low beam headlights in the warning light modules. **TURN SIGNAL/MARKER LIGHTS** Whelen model 400 amber LED lamps shall be mounted outboard of the turn signal at a 45-degree angle off the front of the cab. The lamps are part of the warning light module, and are visible from both the front and side of the vehicle. **LED CORNERING LIGHTS** Whelen model 400 flashing LED-cornering lamps shall be mounted below the marker light in the warning light module. The lamps are mounted at a 45-degree angle off the front of the cab and are visible from the side and front of the vehicle. **DOT LIGHTS** There shall be five-(5) LED marker lights installed on the cabs roof located as high as practical and spaced per DOT guidelines. **CAB GROUND LIGHTS** There shall be one-(1) Whelen model T0CACCCR 2" (5mm) LED light mounted under each cab door illuminating the area below providing a safe entrance and exit for cab occupants. All cab ground lights shall automatically activate when any cab door is opened and by a switch located on the dash. **MECHANICAL SIREN** One (1) Federal Signal Q2B siren model #Q2B-012PSD electro-mechanical siren shall be mounted on the extended front bumper, driver's side outboard. The Q2B siren shall be a streamlined, chrome plated siren designed to provide reliable and long-life operation. The electro-mechanical siren shall produce the distinctive Q2B sound that is a registered trademark of Federal Signal, and shall be provided with a heavy duty clutch and an electric brake. The Q2B siren shall measure 10.5” high x 14” long x 10” deep and shall produce 123 decibels at ten feet. The siren shall operate off the vehicles 12V system. The Q2B siren shall be pedestal mounted in the front of emergency vehicles. The siren brake switch shall be located within reach of the driver.		

SIREN WIRING The siren activation switch shall be wired thru the chassis park brake and operate in the "Response Mode" only. **SIREN FOOT SWITCHES** Two-(2) foot operated switches shall be installed, one-(1) on each side on the driver and officer's side wired to the mechanical siren. **PAC-TRAC TOOL BOARD(S)** Two (2) Pac-Trac tool board(s) shall be installed in the cab for the mounting of additional equipment. The tool board slats shall be provided with Trac Lock inserts and fasteners. **CAB WHEEL WELL DIRECTIONAL LIGHTS** Two (2) Britax 428.111.12V auxiliary side directional/marker lights shall be provided, one (1) each side in the cab wheel well area and wired to the running lights & turn signals. **LIGHTBAR, 72" FORWARD FACING** A Whelen Edge Ultra Freedom Super-LED Series lightbar model FN72QLED 3FLDRR shall be provided. The Edge Ultra Freedom lightbar shall incorporate an anodized extruded aluminum “I” beam chassis with two red Linear-LED corner modules , two red 400 Series Linear-LED endcap lights, eight red 400 Series Linear-LED lights, and two white 400 Series Linear-LED lights with clear optic lenses. The Linear-LED corner modules shall incorporate 12 red Super-LEDs, two clear optic collimators, and utilize a metalized reflector for maximum output. The red 400 Series Linear-LED lights shall incorporate 12 red Super-LEDs, two clear optic collimators, and utilize a metalized reflector for maximum output. The white 400 Series Linear-LED lights shall incorporate 12 white Super-LEDs, two clear optic collimators, and utilize a metalized reflector for maximum output. All Linear-LED lights conformal coated PC boards shall provide additional protection against environmental elements. The hard coated lenses shall provide extended life/luster protection against UV and chemical stresses. The FN72QLED shall include rubber endcap gaskets, lens divider gaskets, and cord seal to help prevent water and other elements from entering the lightbar. The lightbar shall be controlled in the following manner:		

Calling for Right of Way - All Positions Blocking Right of Way - Clear shall not be Active The lights shall be activated by a single emergency light switch located on the master light switch panel in the cab. The lightbar shall meet NFPA 1901 edition as configured. **INBOARD LOWER FRONT WARNING LIGHTS** There shall be two-(2) Whelen model M6R red LED light heads installed inboard of the turn signal in the warning light modules. The lights shall be red with red lens. **FRONT BUMPER WARNING LIGHTS** There shall be two-(2) Whelen model M6R red LED light heads shall installed one-(1) each side of the front bumper. The lights shall be red with red lens. **CAB EXTENSION WARNING LIGHTS** There shall be two-(2) Whelen model M6R red LED light heads installed one-(1) each side on the cab extension. The lights shall be red with red lens. **BACK UP CAMERA SYSTEM** One-(1) Federal Signal model CAMSET-70 color camera system shall be installed on the vehicle. The system shall be wired to the vehicles 12 volt electrical system. The 7" LCD color monitor shall be installed in cab in easy reach of the driver while in the seated position. The color camera shall be installed facing rearward giving a clear and unobstructed view behind the vehicle. The system shall activate when the transmission is shifted in the reverse position. A switch located on the monitor shall activate the system regardless of the transmissions shifted position. This system shall consist of the following components: • One 7" CAMLCD color monitor installed in the cab • One color camera model CAMCCD-REARNTSC with night vision and audio installed high at the rear of the vehicle • 65.5 feet of camera-to-monitor extension cable (CAMCABLE-20) • Multiple camera control box (CAMBOX-4NTSC/CAMBOX-PAL) • Mounting bracket and hardware (CAMLCD-BRACKET)		

ADDITIONAL CAMERA One-(1) Federal Signal model CAMCCD-SIDETSC camera shall be installed on top of the body to the front wired to the monitor. The camera shall be equipped with night vision and audio. **CARRYING CAPACITY PLATE** A permanently attached carrying capacity plate in accordance with NFPA 1901 Standards shall be installed in plain view of the driver. The tag shall include the following: • Overall height • Overall length • GVWR • Seating capacity **SEATING CAPACITY PLATE** A permanently attached Seating Capacity Plate shall be mounted in the cab in plain view that reads “Seating Capacity – 6 People”. Each seating position that is not, intended to be used during transit shall be individually labeled as follows: "WARNING THIS SEAT IS NOT TO BE OCCUPIED WHILE VEHICLE IS IN MOTION" **OCCUPANCY/SEAT BELT PLATE** Occupancy / Seat Belt plates shall be provided and installed visible from each seated position, which reads: "OCCUPANTS MUST BE SEATED AND BELTED WHEN THE APPARATUS IN MOTION" **"DO NOT WEAR HELMET" PLATE** A plate shall be installed visible from each seating position that states: "DO NOT WEAR HELMET WHILE SEATED" **OVERALL HEIGHT/LENGTH/WEIGHT PLATE**		

An Overall Height/Length/Weight information plate shall be installed that can be clearly identified and visible to the driver while in the seated position showing the apparatus completed overall height, length, (in feet and inches) and gross vehicle weight (in tons) current to the apparatus manufactured date. If changes to the vehicle occur while in service, the department must revise the overall height-length-weight plate. **FLUID CAPACITY PLATE** A permanently affixed fluid date plate shall be installed in the driving compartment to indicate the type and quantities of the following fluid used in the vehicle. • Engine Oil • Engine Coolant • Chassis Transmission Fluid • Pump Transmission Lubrication Fluid (if applicable) • Pump Primer Fluid (if applicable) • Drive Axle Lubrication Fluid • Air Conditioning Refrigerant • Air Conditioning Lubrication Oil • Power Steering Fluid • Cab Tilt Mechanism Fluid • Transfer Case Fluid • Equipment Rack Fluid • Air Compressor System Lubricant • Generator System Lubricant • Front Tire Pressure - Cold • Rear Tire Pressure - Cold The following information shall also be supplied on the Fluid Data Plate: • Chassis Manufacturer • Production Number • Paint Number • Year Built • Date Shipped • Vehicle Identification Number **MOVEMENT WARNING PLATE** A permanently affixed Movement Warning plate shall be installed near the door ajar light that reads:		

“DO NOT MOVE APPARATUS WHEN LIGHT IS ON". **"DO NOT RIDE" PLATE** A permanently affixed "DO NOT RIDE" warning plate shall be installed located on the stepping areas of the vehicle warning personnel that riding on or in these areas while the vehicle in motion is prohibited. **PUMP ENCLOSURE, SIDE CONTROL** The pump enclosure superstructure shall be constructed of aluminum tubing, channel, angle, and break-formed components. The framework shall be formed by beveled aluminum alloy extrusions and electrically seam welded both internally and externally at each joint using 5356 aluminum alloy welding wire. The main, frame work shall be constructed of 3.00 x 3.50, 6063-T6 aluminum extrusions. The break-formed components shall be constructed from 3/16" (1.875) aluminum. The cross members support the substructure and the exterior panels independently from the cab and body. The cross members shall be isolated from the frame rails using torsion mounts. The pump enclosure shall be supported at the top of the frame rails, in a minimum of four-(4) places. The module shall be secured with angle brackets bolted to both the pump enclosure support cross rails and the side of the chassis frame rails. This design is required to eliminate shifting and stress on the pump enclosure, pump panels, and running boards. The front of the pump module shall be covered with aluminum tread plate to keep road debris from the front of the pump. Any pump enclosure constructed using any material other than aluminum or utilizing any other mounting method is not acceptable. **ENCLOSED PUMP MODULE** The pump compartment shall be at the forward section of the body, integral with the remainder of the structure. Pump panels on both sides of the vehicle shall be concealed by roll up doors. This design is required to minimize the effects of the elements on the pump panel components and to maximize usable compartment space on the apparatus. The forward section of the pump compartment shall be readily accessible for easy service on the pump and plumbing. Removal of the speed lay reloading trays shall allow full access to the pump compartment. Removal of the backboard storage sleeve shall further improve the service access.		

Speed lays shall be located ahead of the pump compartment, with one-(1) 1-3/4” and one-(1) 2-1/2" located at frame rail height, approximately 43” above street level and one-(1) 1-3/4” located above the rear 2-1/2” speedlay. The forward 1-3/4” speed lay shall be located under the cab notch. The pump enclosure shall provide an area above the pump for the installation of deck gun plumbing in the dunnage area. **DUNNAGE AREA W/ TREADPLATE WALLS** There shall be an open area above the pump enclosure for equipment storage trimmed with 1/8" (.125) aluminum tread plate on all vertical interior walls. **PUMP PANELS** The operator's controls and gauges shall be mounted on pump panels constructed of 1/8" (.125) black anodized, non-glare aluminum. No vinyl coverings shall be acceptable as these surfaces are subjected to rough service and vinyl is susceptible to tearing. All gauges and controls shall be properly identified with color-coded metal tags. The tags shall be affixed with 3M brand industrial adhesive. The gauges shall be functionally grouped above each control. The right side panel shall be vertically hinged and shall have push style latches for pump compartment access. The right side panel shall be constructed of 1/8" (.125) black anodized, non-glare aluminum. All instruments and controls shall be provided and installed as a group at the pump panel. The central midpoint or centerline of any valve control shall be no more than 72" vertically above the ground or platform that is designed to serve as the operator's standing position. The instruments shall be placed to keep the pump operator as far as practical from all discharge and intake connections and in a location where they are readily visible and operationally functional while the operator remains stationary. **PUMP PANEL LIGHT, LEFT SIDE** One-(1) individual On Scene Access LED pump panel light with on/off switch shall be mounted under the light shield left side. For optimum visibility during nighttime operations, the light shall be mounted as high as possible.		

PUMP PANEL LIGHT, RIGHT SIDE One-(1) individual On Scene Access LED pump panel light with on/off switch shall be mounted under the light shield right side. For optimum visibility during nighttime operations, the light shall be mounted as high as possible. **LIGHT, PUMP COMPARTMENT** One-(1) LED compartment light shall be installed in the pump compartment for inspection or routine maintenance wired to the pump panel light switch. **PUMP OPERATOR'S PLATFORM(S)** Two (2) slide-out platform(s) shall be installed under the operator's panel constructed from 3/16” (.1875) aluminum tread plate. Two-(2) sealed roller bearing slides, with a total capacity of 500lbs shall be installed one-(1) each side of the platform mechanically held in both the retracted and extended positions with a rugged quick-action latch. The slide-out platform shall be wired to the open door indicator system activating the light in the cab when the step is in the extended position. **AIR OUTLET, PUMP PANEL** There shall be an air outlet with a valve installed on the pump panel. There shall be a 25' of .375" utility type air hose with "quick release" type fittings compatible with those on the apparatus provided. This shall be plumbed into the chassis air system. **AIR HORN SWITCH, PUMP PANEL** A push button momentary switch mounted on the pump panel shall activate the chassis air horn(s). **PRESSURE GOVERNOR** The apparatus shall be equipped with a Class1 “Total Pressure Governor Plus” (TPG+) Model 118719 that is connected to the Engine Control Module (ECM) mounted on the engine. The “TPG+” shall operate as a pressure sensor (regulating) governor (PSG) utilizing the engine’s J1939 data for optimal resolution and response when supported by the engine manufacturer. If J-1939 engine control is not supported, then analog remote throttle control shall be provided by the “TPG+”. The “TPG+” shall function as a Master Pump Discharge and Intake Gauge.		

The TPG+ shall utilize control algorithms that minimize pressure spikes during low or erratic water supply situations. The "TPG+" shall be backwards compatible to any engine that supplies J1939 RPM, Temperature and Oil Pressure information providing the ability to maintain a consistent fleet fire-fighting capability and reduce operator cross training and confusion. The "TPG+" shall have the ability to use either a 300 or a 600-PSI discharge pressure transducer and a 300-PSI intake pressure transducer. The PSG system diagnostics shall be built in and accessible by technicians. Programmable presets for RPM and Pressure settings shall be easily configurable. The straightforward menu structure shall allow the "TPG+" configuration to match existing apparatus operation as closely as possible. The "TPG+" shall also include indication of engine RPM, system voltage, engine oil pressure, and engine/transmission temperature with audible alarm output for all. The "TPG+" uses the J1939 data bus for engine information, requiring no additional sensors to be installed. The TPG+ shall monitor and display pump and engine hours. The "TPG+" shall use J1939 broadcast warnings for the alarm as a standard and allow the "user" to select warning values if "SOP's" dictate. **PRESSURE GAUGES, 2-1/2"** The discharges shall be provided with 2-1/2" pressure gauges. The discharge gauges shall be liquid filled with a solution to assure visual readings and reduce inner lens condensation. The body of the gauges shall be constructed of Zytel nylon with chrome-plated bezels. The face of the gauges shall be Spun Metal with black background and white markings reading from zero to 400 PSI. The gauges shall be installed at each discharge control on the pump operator's panel. On side mount pump applications with push pull handles each gauge shall incorporate a Thuemling Instrument Group 1-piece module assembly consisting of the gauge, push-pull and trim bezel. The pressure gauges shall maintain performance of all features and be free from defects in material and workmanship which includes fluid fill leakage and discoloration for seven years. **GAUGE BEZELS, COLOR CODED** The pump panel master and pressure gauge bezels shall be color coded.		

PUMP PANEL TAGS All discharges, gauges, and controls will be properly identified by color-coded metal tags. The metal tags will be affixed with 3M industrial adhesive. **PUMP SYSTEM, HALE QMAX SINGLE STAGE** **PUMP ASSEMBLY** The entire pump shall be cast, manufactured, and tested at the pump manufacturer's factory. The pump shall be driven by a driveline from the truck transmission. The engine shall provide sufficient horsepower and RPM to enable pump to meet and exceed its rated performance. The entire pump, both suction and discharge passages, shall be hydrostatically tested to a pressure of 600 PSI. The pump shall be fully tested at the pump manufacturer's factory to the performance specs as outlined by the latest NFPA Pamphlet No. 1901. The pump shall be free from objectionable pulsation and vibration. The pump body and related parts shall be of fine grain, cast iron alloy, with a minimum tensile strength of 30,000 PSI. All moving parts in contact with water shall be of high quality bronze or stainless steel. Pump utilizing castings made of lower tensile strength cast iron not acceptable. Pump body shall be horizontally split, on a single plane, in two sections, for easy removal of entire impeller assembly including wear rings and bearings from beneath the pump without disturbing piping or the mounting of the pump in chassis. The pump shall have one double suction impeller. The pump body shall have two opposed discharge volute cutwaters to eliminate radial unbalance. Pump shaft to be rigidly supported by three bearings for minimum deflection. One high lead bronze sleeve bearing shall be located immediately adjacent to the impeller (on side opposite the drive unit). The sleeve bearing is to be lubricated by a force-fed, automatic oil lubricated design, pressure balanced to exclude foreign material. The remaining bearings shall be heavy-duty, deep groove ball bearings in the gearbox and they shall be splash lubricated. The pump impeller shall be hard, fine grain bronze of the mixed flow		

design; accurately machined, hand-ground and individually balanced. The vanes of the impeller intake eyes shall be hand ground and polished to a sharp edge, and be of sufficient size and design to provide ample reserve capacity utilizing minimum horsepower. The impeller clearance rings shall be bronze, easily renewable without replacing impeller or pump volute body, and of wraparound double labyrinth design for maximum efficiency. The pump shaft shall be heat-treated, electric furnace, corrosion resistant, stainless steel, to be super-finished under packing with galvanic corrosion (zinc separators in packing) protection for longer shaft life. Pump shaft must be sealed with double lip oil seal to deep road dirt and water out of drive unit. **DRIVE UNIT** The drive unit shall be cast and completely manufactured and tested at the pump manufacturer's factory. Pump drive unit shall be of sufficient size to withstand up to 16,000 ft. Lbs. Torque of the engine in both road and pump operating conditions. The drive unit is designed with ample capacity for lubrication reserve to maintain proper operating temperature. The gearbox drive shafts shall be of heat-treated chrome nickel steel and at least 2-3/4" in diameter, on both the input and output drive shafts. They shall withstand the full torque of the engine in both road and pump operating conditions. All gears drive and pump, shall be of highest quality electric furnace, chrome nickel steel. Bores shall be ground to size and teeth integrated, crown-shaved and hardened, to give an extremely accurate gear for long life, smooth, quiet running, and higher load carrying capability. An accurately cut spur design shall be provided to eliminate all possible end thrusts. The pump ratio shall be selected by the apparatus manufacturer to give maximum performance with the engine and transmission selected. If drive unit is equipped with a power shift, the shifting mechanism shall be a heat-treated, hard-anodized aluminum power cylinder, with stainless steel shaft. An in-cab control for rapid shift shall be provided that locks in road or pump. Three warning lights with plates shall be provided to alert the operator		

when the drive unit has fully shifted from road to pump position. Two lights shall be located on the cabs instrument panel and the other on the pump panel adjacent to the throttle. A 3" clapper check valve shall be installed between the suction side of the pump and the tank-to-pump valve. This 3" clapper valve shall remove the possibility of a water surge expanding the booster tank. Pump system shall have an integral discharge manifold system that allows a direct flow of water to all discharge valves. **PACKING GLANDS** The pump shaft shall have only one packing gland located on the inlet side of the pump. It shall be of split design for ease of repacking. The packing gland must be a full circle threaded design to exert uniform pressure on packing and to prevent "cocking" and uneven packing load when it is tightened. It shall be easily adjusted by hand with rod or screwdriver, with no special tools or wrenches required. The packing rings shall be of a unique, permanently lubricated, long life graphite composition and have sacrificial zinc foil separators to protect the pump shaft from galvanic corrosion. **PUMP SHIFT** An air operated pump shift shall be installed in the chassis cab to engage the fire pump. Provisions shall be made for placing the pump drive system in operation using controls and switches that are clearly identified and within convenient reach of the operator while in the cab. A green indicator light shall be installed on the cab dash and labeled "Pump Engaged". Where an automatic chassis transmission is provided, a green indicator light in the driving compartment and a green indicator light located at the pump operator's position shall be provided and shall be energized when both the pump shift has been completed and the chassis transmission is engaged in pump gear. The light in the driving compartment shall be labeled "OK TO PUMP". The light on the pump operator shall be positioned adjacent to and preferably above the throttle control and shall be labeled "Warning: DO NOT OPEN THROTTLE UNLESS LIGHT IS ON". The green light on the pump operator's panel shall be energized when the pump is engaged, the transmission is in drive, and the parking brake is set.		

PUMP PRIMING SYSTEM

A Hale model ESP 12 volt positive displacement vane primer shall be installed. The primer shall be electrically driven and conform to the standards outlined in the current NFPA Pamphlet. The system is an oil-less system and environmentally safe. It contains an electric rotary vane type positive displacement primer that operates off 12V or 24V power. The primer motor is totally enclosed to prevent dust, dirt and water from penetrating. The unit is constructed of heat-treated anodized aluminum, specially coated for wear and corrosion resistance. The control shall be pump panel mounted to operate the priming valve and start the priming motor.

VALVE, MASTER DRAIN

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

U.L. TEST POINTS

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

U.L. CERTIFICATION, 1500 GPM

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

The testing organization must meet the following minimum requirements:

- Must be nationally recognized testing laboratory recognized by OSHA
- Must comply with the ASTM (American Society for Testing Materials) standard E543 "Determining the qualifications for nondestructive testing agencies"
- Must have more than forty (40) years of Automotive Fire

Apparatus safety testing experience and more than fifteen (15) years of factory aerial device testing and Certification experience

- Must not represent, be associated with, or in the manufacture or repair of automotive fire apparatus
- Must provide proof of ten-(10) million dollars in excess liability insurance for bodily injury and property damage combined

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

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

PUMP TEST CERTIFICATION PLATE

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

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

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

SUCTION HEADERS

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

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

INTAKE RELIEF VALVE

There shall be an Akron model 59 suction side relief valve provided in the

pump system. The relief valve is adjustable from 50-175 psi and set at the factory at 125 psi. **TANK TO PUMP** One (1) 3” ball valve shall be installed between the pump and the water tank. The tank to pump valve shall be a quarter turn, fixed pivot design constructed from bronze. The valve shall be air operated from the pump operator's control panel. **TANK FILL** There shall be a 2" pump to tank fill line installed, with a 2" inline bronze valve and high-pressure flexible hose tested to 1200 PSI. The valve shall be (locking "T" handle) push-pull controlled at the pump operator’s panel. **ENGINE COOLER** The engine cooler shall be installed in-line from the discharge side of the pump, and installed in the engine cooling system. There shall be a 1/2", quarter turn valve installed thru the pump panel and shall be clearly labeled. **PUMP COOLER** The pump shall have a 3/8" line installed from the pump discharge, to the water tank to cool the pump during long periods of pumping when water is not being discharged. The pump cooler shall be controlled from the pump operators panel by a 3/8" valve consisting of a cast bronze body with 1/4 turn chrome plated bronze ball, reinforced Teflon seals, and blow-out-proof stem rated to 600 PSI. The valve shall be installed thru the pump panel and clearly labeled. **PLUMBING SYSTEM** All suction and discharge lines of 2" or larger shall be constructed of a minimum of Schedule 40 galvanized steel pipe, where vibration or chassis flexing may damage or loosen threaded pipes, Victaulic or Roustabout couplings shall be used. All suction and discharge outlets shall have National Standard Threads (NST) and designed for 500 PSIG including, valves, drain cocks, lines, intake, and outlet closures, excluding the tank fill and tank to pump lines (tank side of the valves). **PUMP/PLUMBING PAINTING**		

The pump shall be painted black. This includes all intakes, discharges, manifolds, and associated valves.

AKRON PUSH-PULL CONTROL VALVE PACKAGE

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

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

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

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

SUCTION, 2-1/2" LEFT REAR PANEL

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

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

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

INTEGRAL DROOP ELBOWS

All 2-1/2" side discharge outlets shall terminate with chrome-plated 30-

Degree elbows with 2-1/2" MNST threads, chrome vented cap and chain. **FRONT BUMPER DISCHARGE** There shall be one-(1) front discharge installed in the front bumper, center hose well. The front bumper discharge shall terminate 2" NPT x 1-1/2" NST with a 90-degree swivel. One-(1) 2" brass valve with 3/4" drain shall be installed on the discharge side of the pump plumbed to the front swivel with flexible high-pressure hose and victaulic stainless steel couplings tested to 1200 PSI, the front discharge shall be push/pull controlled at the pump operator's panel. **NO. 1 SPEEDLAY, 1-3/4" DOUBLE LAY** One-(1) pre-connected speed lay compartment shall be provided ahead of the side mount operator's panel accommodating 200' of 1-3/4" double jacket hose, with stainless steel nylon guided rollers installed at each end, and stainless steel scuff plates around the perimeter of the speed lay protecting the painted surfaces. One-(1) 2" ball valve with 3/4” drain and Chicksan swivel shall be provided plumbed to the speed lay with 2" high-pressure flexible hose stainless steel couplings tested to 1200 PSI, the valve shall be push/pull controlled at the pump operator's panel. Each discharge is equipped with a quarter-turn drain valve. **NO. 2 SPEEDLAY, 1-3/4" DOUBLE LAY** One-(1) pre-connected speed lay compartment shall be provided ahead of the side mount operator's panel accommodating 200' of 1-3/4" double jacket hose, with stainless steel nylon guided rollers installed at each end, and stainless steel scuff plates around the perimeter of the speed lay protecting the painted surfaces. One-(1) 2" ball valve with 3/4” drain and Chicksan swivel shall be provided plumbed to the speed lay with 2" high-pressure flexible hose stainless steel couplings tested to 1200 PSI, the valve shall be push/pull controlled at the pump operator's panel. Each discharge is equipped with a quarter-turn drain valve. **NO. 3 SPEEDLAY, 2-1/2" DOUBLE LAY**		

One-(1) pre-connected speed lay compartment shall be provided ahead of the side mount operator's panel accommodating 200' of 2-1/2" double jacket hose, with stainless steel nylon guided rollers installed at each end, and stainless steel scuff plates around the perimeter of the speed lay protecting the painted surfaces. One-(1) 2-1/2" ball valve with 3/4” drain and Chicksan swivel shall be provided plumbed to the speed lay with 2-1/2" high-pressure flexible hose stainless steel couplings tested to 1200 PSI, the valve shall be push/pull controlled at the pump operator's panel. Each discharge is equipped with a quarter-turn drain valve. **REMOVABLE SPEEDLAY HOSE TRAYS** There shall be three-(3) removable, speed lay hose trays provided with the apparatus constructed of 3/16" smooth aluminum with handles at each end held in place by horizontal bulkheads at each end of the compartments. **SPEEDLAY COVERS** Three-(3) Cargo net covers shall be provided on each side of the apparatus preventing hose from inadvertently deploying during normal operations meeting the current NFPA requirements. The end flaps shall be black in color. **DISCHARGE, 2-1/2" LEFT FRONT PANEL** One-(1) Akron 2-1/2" Heavy-Duty ball valve with 3/4” drain shall be installed at the pump panel left front plumbed to the discharge side of the pump push/pull controlled from the pump operator's panel. **DISCHARGE, 2-1/2" LEFT REAR PANEL** One-(1) Akron 2-1/2" Heavy-Duty ball valve with 3/4” drain shall be installed at the pump panel, left rear, plumbed to the discharge side of the pump push/pull controlled from the pump operator's panel. **DISCHARGE, 3" RIGHT FRONT PANEL** One-(1) Akron 3" Heavy-Duty (Slo-Close) ball valve with 3/4” drain shall be installed at the pump panel, right front, plumbed to the discharge side of the pump equipped with 3" NST threads chrome cap and chain push-pull controlled at the pump operator's panel.		

DISCHARGE, 2-1/2" RIGHT REAR PANEL One-(1) Akron 2-1/2" Heavy-Duty ball valve with 3/4" drain shall be installed at the pump panel, right rear, plumbed to the discharge side of the pump push/pull controlled from the pump operator's panel. **DECK GUN PLUMBING, 3"** One-(1) Akron 3" Heavy-Duty (Slo-Close) inline valve with 3/4" drain shall be plumbed to the Deck Gun discharge outlet with 3" pipe terminating 3" FNPT x four-(4) bolt flange push-pull controlled at the pump operator's panel. **PRECONNECT, 2-1/2" LEFT FRONT HOSEBED** One-(1) 2-1/2" preconnect shall be installed in the hosebed, left front, plumbed with an Akron 2-1/2" Heavy-Duty ball valve with 3/4" drain terminating 2-1/2" FNPT x 2-1/2" MNST chrome cap and chain push-pull controlled at the pump operator's panel. **FILL SUBSURFACE/RETURN LINE** There shall be one-(1) subsurface/return line installed in the booster tank. The subsurface/return line shall prevent aeration of the water in the booster tank under low water conditions. The subsurface/return line piping shall be of the same size as the "Tank Fill". **WATER TANK** The tank shall have a capacity of 1000 U.S. gallons and shall be constructed of PT3™ polypropylene material. This material shall be a non-corrosive stress relieved thermoplastic and UV stabilized for maximum protection. Tank shell thickness may vary depending on the application and may range from ½ to 1" as required. Internal baffles are generally 3/8" in thickness. **ISO CERTIFICATION** The tank must be rectangular in design and fabricated by a tank manufacturer that is ISO 9001:2008 certified in each of its locations. The ISO certification must be to the current standard in effect at the time of the design and fabrication of the tank. **DESIGN** Each tank is designed to the customer's specification and/or drawing		

submittal. An approval drawing is sent to the customer prior to commencing manufacturing. Upon receipt of the signed approval drawing, the tank is scheduled for production. **CONSTRUCTION** The booster and/or foam tank shall be of a specific configuration and is so designed to be completely independent of the body and compartments. Joints and seams shall be fused using nitrogen gas as required and tested for maximum strength and integrity. The tank construction shall include PolyProSeal™ technology wherein a sealant shall be installed between the plastic components prior to being fusion welded. This sealing method shall provide a liquid barrier offering leak protection in the event of a weld compromise. The top of the booster tank is fitted with removable lifting assembly designed to facilitate tank removal. The transverse and longitudinal swash partitions shall be manufactured of a minimum of 3/8" PT3™ polypropylene. All partitions shall be equipped with vent and air holes to permit movement of air and water between compartments. The partitions shall be designed to provide maximum water flow. All swash partitions interlock with one another and are completely fused to each other as well as to the walls of the tank. All partitions and spacing shall comply with NFPA 1901. The walls shall be welded to the floor of the tank providing maximum strength as part of the tank's unique Full Floor Design™. Tolerances in design allow for a maximum variation of 1/8" on all dimensions. **WATER FILL TOWER AND COVER** The tank shall have a combination vent and manual fill tower. The fill tower shall be constructed of 1/2" PT3™ polypropylene and shall be a minimum dimension of 8" x 8" outer perimeter. The fill tower shall be blue in color indicating that it is a water-only fill tower. The tower shall be located in the left front corner of the tank unless otherwise specified by the tank manufacturer to the purchaser. The tower shall have a 1/4" thick removable polypropylene screen and a PT3™ polypropylene hinged cover. The capacity of the tank shall be engraved on the top of the fill tower lid. Inside the fill tower there shall be a combination vent/overflow pipe. The vent overflow shall be a minimum of schedule 40 polypropylene pipe with a minimum I.D. of 4" that is designed to run through the tank, and shall be piped to discharge water behind the rear wheels as required in NFPA 1901 so as to not interfere with rear tire traction. The tank cover shall be constructed of 1/2" thick PT3™ polypropylene and UV stabilized, to incorporate a multi-piece locking design, which allows for individual removal and inspection if necessary. The tank cover(s) shall be flush or recessed 3/8" from the top of the tank and shall		

be fused to the tank walls and longitudinal partitions for maximum integrity. Each one of the covers shall have hold downs consisting of 2" minimum polypropylene dowels spaced a maximum of 40" apart. These dowels shall extend through the covers and shall assist in keeping the covers rigid under fast filling conditions. A minimum of two lifting dowels shall accommodate the necessary lifting hardware. **SUMP** There shall be one (1) sump standard per tank. The sump shall be constructed of a minimum of 1/2" PT3™ polypropylene and be located in the left front quarter of the tank, unless specified otherwise. On all tanks that require a front suction, a 3" schedule 40 polypropylene pipe shall be installed that shall incorporate a dip tube from the front of the tank to the sump location. The sump shall have a minimum 3" NPT threaded outlet on the bottom for a drain plug per NFPA. This shall be used as a combination clean-out and drain. All tanks shall have an anti-swirl plate located approximately 3" above the inside floor. **OUTLETS** There shall be two (2) standard tank outlets: one for the tank-to-pump suction line, which shall be sized to provide adequate water flow to the pump; and, one for tank fill line, which shall be sized according to the NFPA minimum size chart for booster tanks. All tank fill couplings shall be backed with flow deflectors to break up the stream of water entering the tank, and be capable of withstanding sustained fill rates of up to 1000 GPM. The addition of rear suction fittings, nurse valve fittings, dump valve fittings, and through-the-tank sleeves to accommodate rear discharge piping must be specified. All auxiliary outlets and inlets must meet all NFPA guidelines in effect at the time of manufacture. **MOUNTING** The UPF Poly-Tank® III shall rest on the body cross members in conjunction with such additional cross members, spaced at a distance that would not allow for more than 530 square inches of unsupported area under the tank floor. In cases where overall height of the tank exceeds 40 inches, cross member spacing must be decreased to allow for not more than 400 square inches of unsupported area. The tank must be isolated from the cross members through the use of hard rubber strips with a minimum thickness and width dimension of 1/4" x 1" and a Shore A Hardness of approximately 60 durometer. The rubber must be installed so it shall not become dislodged during normal operation of the vehicle. Additionally, the tank must be supported around the entire bottom outside perimeter and captured both in the front and rear as well as side to side to		

prevent tank from shifting during vehicle operation. A picture frame type cradle mount with a minimum of 2" x 2" x 1/4" mild steel, stainless steel, or aluminum angle shall be provided or the use of corner angles having a minimum dimension of 4" x 4" x 1/4" by 6" high are permitted for the purpose of capturing the tank. Although the tank is designed on a free floating suspension principle, it is required that the tank have adequate vertical hold down restraints to minimize movement during vehicle operation. If proper retention has not been incorporated into the apparatus hose floor structure, an optional mounting restraint system shall be located on top of the tank, half way between the front and the rear on each side of the tank. These stops can be constructed of steel, stainless steel or aluminum angle having minimum dimensions of 3" x 3" x 1/4" and shall be approximately 6" to 12" long. These brackets must incorporate rubber isolating pads with a minimum thickness of 1/4" inch and a hardness of 60 durometer affixed on the underside of the angle. The angle should then be bolted to the body side walls of the vehicle while extending down to rest on the top outside edge of the upper side wall of the tank. Hose beds floors must be so designed that the floor slat supports extend full width from side wall to side wall and are not permitted to drop off the edge of the tank or in any way come in contact with the individual covers where a puncture could occur. Tank top must be capable of supporting loads up to 200 lbs. per sq. foot when evenly distributed. Other equipment such as generators, portable pumps, etc. must not be mounted directly to the tank top unless provisions have been designed into the Poly-Tank® III for that purpose. The tank shall be completely removable without disturbing or dismantling the apparatus structure. **CAPACITY CERTIFICATION** All water and foam tanks shall be tested and certified as to capacity on a calibrated and certified tilting scale. Each tank shall be weighed empty and full to provide precise fluid capacity. Each Poly-Tank® III is delivered with a Certificate of Capacity delineating the weight empty and full and the resultant capacity based on weight. Engineering estimates for capacity calculations shall not be permitted for capacity certification. **TANKNOLOGY™ TAG** A tag shall be installed on the apparatus in a convenient location and contain pertinent information including a QR code readable by commercially available smart phones. The information contained on the tag shall include the capacity of the water and foam (s), the maximum fill and pressure rates, the serial number of the tank, the date of manufacture, the tank manufacturer, and contact information. The QR code shall allow the user to connect with the tank manufacturer for additional information and assistance.		

WATER TANK SIZE CERTIFICATION

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

GAUGE, WATER LEVEL

There shall be a Class 1 Intelli-Tank model ITL-40M tank level gauge supplied and mounted on the pump operator's panel to monitor the level of water in the tank. The tank level gauge shall indicate the liquid level or volume on an easy to read LED display and show increments of 1/8 of a tank.

Each tank level gauge system shall include:
A pressure transducer that is mounted on the outside of the tank in an easily accessible area. Sealed foam tanks will require zero pressure vacuum vents.

A super bright LED display viewable from 180 degrees with a visual indication at nine accurate levels.

A set of weather resistant connectors to connect to the digital display, to the pressure transducer and to the apparatus power.

APPARATUS BODY

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

SUBFRAME

The main body support cross member extrusions shall be 3" x 4" 6061T6 aluminum alloy, double "I" beam with a wall thickness of 7/16" (.438"). These cross members shall extend the full width of the body to support the compartment framing. The cross members shall be welded to a 3/4" (.750") x 3" solid aluminum, 6061T6 aluminum (alloy frame rail) extrusion. The frame rail extrusion shall be shaped in contour with the chassis frame rails. The frame rail extrusion shall be mounted over a 1/2" (.5") thickness, reinforced rubber cushion to isolate the aluminum subframe from the chassis steel frame rails. The apparatus body structure shall be securely fastened to the chassis frame rails with a minimum of six (6) 5/8" (.625") cross member OD, steel U-bolts. The main body support cross member shall have a gusset above and below each cross member.

The gussets shall be constructed of 2.0" x 4.0" 6063T6 aluminum alloy extrusion with a .190" wall thickness. The gussets shall be continuously welded with 5356 aluminum alloy welding wire to add support to the body sidewalls. The main body supports and the longitudinal double "I" beam supports shall have a "C" shaped rubber tank cushion installed on the top of each member. This rubber extrusion shall conform to the shape of the double "I" beam extrusion to keep the tank cushion in place. This method is used to prevent damage to the tank. Absolutely no pop-rivets, screws or any other hardware shall be used to hold the rubber tank cushion in place. **BODY CONSTRUCTION** The complete apparatus body structure shall be an all welded construction and be free from nuts, bolts and other fasteners. Upon completion of the weldments, the body shall be completely sanded and deburred for removal of all sharp edges. The body framework shall be formed from beveled aluminum alloy extrusions and electrically seam welded at each joint using 5356 aluminum alloy welding wire. Body sides shall be formed from 5052 H-32 (marine grade) smooth aluminum plates. The horizontal surfaces above the compartment tops shall be constructed from aluminum tread plate. The horizontal and vertical frame member extrusions shall be 2.0" x 4.0" with a .190" wall thickness. The extrusion shall be made from 6063T6 aluminum alloy. This extrusion shall have .190" outside radius corners. The longitudinal frame member, below the lower compartments shall be a 2.0" x 4.0" 6063T6 aluminum alloy extrusion with .190" radius corners. Each body corner shall be a 3.5" x 9.75" 6063T6 extruded aluminum section with .210" wall thickness, and shall be welded as an integral part of the body. This extrusion shall have a 1" corner radius. The wheel well shall be constructed from 2" x 4" x .190" wall thickness. The extrusion shall be made from 6063T6 aluminum alloy and have .190" outside radius corners. The extrusion shall be slotted the full length to permit an internal fit of 1/8" (.125") aluminum tread plate panels. The wheel well liners shall be constructed of 3003 H-14 smooth aluminum plates. They shall be bolted in place for ease of maintenance. The wheel well fenderettes shall be constructed of #304 Stainless steel with a #7 polished finish. A deflection shield shall be mounted to the body subframe to keep road debris from entering the water tank area.		

HOSE BED The hose bed shall be located inboard of the driver side upper body storage compartments and the ladder storage compartment. The hose bed sides shall be constructed of 3/16" (.1875") 5052 H-32 (marine grade) smooth aluminum plate welded to the extruded framework. There shall be a 3" x 3.5" 6063T6 aluminum extrusion with .190" wall thickness running the entire length of the hosebed at the top for structural rigidity. The hose bed decking shall be constructed from anodized aluminum extrusions. The extrusions shall be 3/4" (.750") x 8.125" and have 3/4" (.750") x 3.00" hat channel attached to the underside to form a one-piece grid. The entire deck shall be removable, in one piece, to allow ease of serviceability to the tank. The hosebed shall include an extrusion across the front and rear of the compartment for the installation of adjustable hosebed dividers. The fire apparatus hose body shall be 29" wide x 30” high x 187” long and shall contain a minimum of 90 cubic feet of storage. **COMPARTMENT CONSTRUCTION** The compartment seams shall be sealed with permanent pliable silicone caulking. Each compartment shall be vented through a 3"W x 15"H louver that is machined stamped. The panel shall be removable to provide access to service wiring and other mounted components. **COMPARTMENT SIZES** There shall be a minimum of 536 cubic feet of storage provided on the apparatus, as described in the paragraphs below. This total does not include the enclosed ladder storage compartment, located between the upper right compartments and the hose bed. **FORWARD TRANSVERSE** There shall be a backboard storage module located within the L1/R1 compartments. This backboard module shall be constructed from welded 3/16” thick smooth aluminum plate, complete with welded partitions. The module shall be designed to carry three (3) backboards. Each opening shall be approximately 3” high x 18” wide x 72” deep. This module shall contain approximately 6.75 cubic feet of storage. The outer left and right sections shall be welded to the body structure. The center section shall be completely removable for improved pump service access. The center section shall slide out with the release of two (2) stainless steel butterfly latches.		

ROOF TOP STORAGE COMPARTMENTS Six (6) roof top compartments shall be installed three each side in the upper body. The compartments shall be constructed from 3/16" smooth aluminum plate. Each compartment shall have a door constructed from aluminum tread plate. The doors shall have a stainless steel piano type hinge and chest style latch. Compartments shall have a 1/2" flange around the opening to prevent water from entering the compartment when the door is closed. The doors shall be held open with gas shocks. Each compartment shall have one (1) compartment light that activates when the door is open. The center walkway shall be the aluminum hose bed cover. Each compartment shall have a drain at each end, to drain straight to the ground. There shall be three (3) roof top compartments over the left side of the apparatus. The entire open compartment shall measure approximately 215” long x 23” across x 20” deep. The left side upper body compartments shall contain approximately 57.2 cubic feet of storage. There shall be three (3) useable door openings of approximately 69.5" long x 23" across. There shall be three (3) roof top compartments over the right side of the apparatus. The right side compartments are slightly smaller to allow for a landing area above the rear access ladder. The entire open compartment shall measure approximately 193” long x 23” across x 20” deep. The left side upper body compartments shall contain approximately 51.4 cubic feet of storage. Each compartment shall have a useable door opening of approximately 62" long x 23" across. **LEFT SIDE** There shall be one (1) compartment installed under the lower 1-3/4" and 2-1/2" double speed lays. This compartment shall have a vertically hinged door. The interior compartment dimensions shall be approximately 17.5"W x 17.75"H x 18"D in the upper section and 26”D in the lower section. The compartment shall have a useable door opening of approximately 17.5"W x 17.75"H. There shall be approximately 3.8 cubic feet of storage capacity. There shall be one (1) compartment installed above the 1-3/4” upper speed lay. This compartment shall have a vertically hinged door. The interior compartment dimensions shall be approximately 9.5"W x 44.75"H x 27.5"D in the lower section and 86”D in the upper section to shall accommodate a stokes basket. The stokes basket shall measure 84.5" long x 24" wide x 8" tall. The compartment shall have a useable door opening		

of approximately 9.5"W x 44.75"H. There shall be approximately 16 cubic feet of storage capacity. There shall be one (1) left front compartment installed at the front of the body, containing the left side pump panel. This compartment shall have a roll-up door. The interior compartment dimensions shall be approximately 32.5"W x 74"H. The compartment shall have a useable door opening of approximately 29.5"W x 65"H. There shall be approximately 5 cubic feet of storage over the pump panel. There shall be one (1) left side compartment installed ahead of the rear axle. This compartment shall have a roll-up door. The interior compartment dimensions shall be approximately 57"W x 74"H x 27.5"D. The compartment shall have a useable door opening of approximately 54"W x 65"H. There shall be approximately 67.1 cubic feet of storage capacity. There shall be one (1) compartment installed over the wheel well. This compartment shall have a roll-up door. The compartment shall be approximately 58"W x 38"H x 27.5"D. The compartment shall have a useable door opening of approximately 55"W x 29"H. There shall be approximately 35 cubic feet of storage capacity. There shall be one (1) left rear compartment installed behind the rear axle. This compartment shall have a roll-up door. The interior dimensions shall be approximately 59"W x 74"H x 27.5"D in the upper and transverse in the lower. The compartment shall have a useable door opening of approximately 56"W x 65"H. There shall be approximately 69.5 cubic feet of storage capacity. **CENTER REAR** There shall be one (1) compartment installed at the center rear of the apparatus. This compartment shall have a roll up door. The interior dimensions shall be approximately 44"W x 51.25"H x 44"D in the lower section and 14”D in the upper section. The compartment shall have a useable door opening of approximately 41"W x 43.5"H. There shall be approximately 39.7 cubic feet of storage capacity. **RIGHT SIDE** There shall be one (1) compartment installed under the lower 1-3/4" and 2-1/2" double speed lays. This compartment shall have a vertically hinged door. The interior compartment dimensions shall be approximately 17.5"W x 17.75"H x 30"D. The compartment shall have a useable door opening of approximately 17.5"W x 17.75"H. There shall be		

approximately 5.4 cubic feet of storage capacity. There shall be one (1) compartment installed above the 1-3/4" upper speed lay. This compartment shall have a vertically hinged door. The interior compartment dimensions shall be approximately 9.5"W x 44.75"H x 27.5"D in the lower section and 15"D in the upper section. The compartment shall have a useable door opening of approximately 9.5"W x 35"H. There shall be approximately 3 cubic feet of storage capacity. There shall be one (1) right front compartment installed at the front of the body, containing the right side pump panel. This compartment shall have a roll-up door. The interior compartment dimensions shall be approximately 32.5"W x 74"H. The compartment shall have a useable door opening of approximately 29.5"W x 65"H. There shall be approximately 5 cubic feet of storage over the pump panel. There shall be one (1) right side compartment installed ahead of the rear axle. This compartment shall have a roll-up door. The interior compartment dimensions shall be approximately 57"W x 74"H x 27.5"D. The compartment shall have a useable door opening of approximately 54"W x 65"H. There shall be approximately 67.1 cubic feet of storage capacity. There shall be one (1) compartment installed over the wheel well. This compartment shall have a roll-up door. The compartment shall be approximately 58"W x 38"H x 27.5"D. The compartment shall have a useable door opening of approximately 55"W x 29"H. There shall be approximately 35 cubic feet of storage capacity. There shall be one (1) right rear compartment installed behind the rear axle. This compartment shall have a roll-up door. The interior dimensions shall be approximately 59"W x 74"H x 27.5"D in the upper and transverse in the lower. The compartment shall have a useable door opening of approximately 56"W x 65"H. There shall be approximately 69.5 cubic feet of storage capacity. **REAR LADDER STORAGE COMPARTMENT** There shall be one-(1) equipment storage compartment installed between the hose bed and upper right roof top compartments. The compartment shall be constructed of 1/8" (.125) smooth aluminum plate for the storing of NFPA required equipment. Individual internal compartments shall house one-(1) 24' extension ladder, one-(1) 14' roof ladder, one-(1) 10' folding ladder, and two-(2) pike poles with silencing pads made from Polypropylene installed on each compartment floor to assist in the loading and unloading of the required equipment. The compartment shall have a		

vertically hinged double pan door.

VERTICAL LOAD TEST, APPARATUS BODY

The fire body shall exceed a vertical load testing. The vertical load test to the fire body shall follow the same strict and detailed requirements of the Economic Commission for Europe Structural Standard, ECE-29R as applied to the cab.

The fire body shall be placed under a vertical load test to show structural integrity. There shall be 65,979 lbs. (29.53 metric tons) applied to the fire body. There shall be no structure failures to the body and body compartments.

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

COMPARTMENT DOORS, SIDE HINGED

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

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

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

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

COMPARTMENT DOORS, SIDE ROLL UP

ROM roll-up doors shall be installed on the side compartments of the apparatus as specified. Slats are to double-wall (box frame) aluminum extrusion. Exterior surfaces are to be flat. Interior surfaces are to be concave to prevent loose equipment from jamming doors. The slats must be anodized to eliminate oxidation. The slats are to have inner-locking end shoes on every slat secured by a Punch-Dimple process. The slats are to have interlocking joints with a folding locking flange. Between each slat shall be a PVC/vinyl inner seal to prevent any metal-to-metal contact. The track shall be one-piece aluminum, which has an attaching flange and finishing flange incorporated into its design, which provides a finish look to installation without additional trim or caulking. The track is to have a replaceable side seal. The side seal shall prevent water and dust intrusion into the compartment. There shall be an aluminum drip rail above each compartment door with a built in replaceable wiper seal. Each roll up door shall have a counter balance to assist in lifting and eliminate the risk of accidental closing. A full width lift bar, operable by one hand, shall be used as a positive latch device for securing each individual compartment door in the closed position. The outside door shall have a natural finish. There shall be an anodized aluminum sill plate installed over the compartment door. **COMPARTMENT DOORS, REAR ROLL UP** A ROM roll-up door shall be installed on the rear compartment of the apparatus. Slats are to double-wall (box frame) aluminum extrusion. Exterior surfaces are to be flat. Interior surfaces are to be concave to prevent loose equipment from jamming doors. The slats must be anodized to eliminate oxidation. The slats are to have inner-locking end shoes on every slat secured by a Punch-Dimple process. The slats are to have interlocking joints with a folding locking flange. Between each slat shall be a PVC/vinyl inner seal to prevent any metal-to-metal contact. The track shall be one-piece aluminum, which has an attaching flange and finishing flange incorporated into its design, which provides a finish look		

to installation without additional trim or caulking. The track is to have a replaceable side seal. The side seal shall prevent water and dust intrusion into the compartment. There shall be an aluminum drip rail above each compartment door with a built in replaceable wiper seal. Each roll up door shall have a counter balance to assist in lifting and eliminate the risk of accidental closing. A full width lift bar, operable by one hand, shall be used as a positive latch device for securing each individual compartment door in the closed position. The outside door shall have a natural finish. There shall be an anodized aluminum sill plate installed over the compartment door. **PULL DOWN STRAP(S), COMPARTMENT DOOR** There shall be eight (8) pull-down strap(s) provided on the specified compartment door(s) to aid in closing the door(s). **WHEEL WELL AIR BOTTLE COMPARTMENT, LEFT FRONT** There shall be an air bottle compartment located in the rear wheel well left front to house two-(2) spare SCBA cylinders. The bottom of the tubes shall be supported to eliminate breakage. The tubes are vented to facilitate moisture drainage. The compartment door shall be a stainless steel with a positive mechanical latch. **WHEEL WELL AIR BOTTLE COMPARTMENT, LEFT REAR** There shall be an air bottle compartment located in the rear wheel well left rear to house two-(2) spare SCBA cylinders. The bottom of the tubes shall be supported to eliminate breakage. The tubes are vented to facilitate moisture drainage. The compartment door shall be a stainless steel with a positive mechanical latch. **WHEEL WELL AIR BOTTLE COMPARTMENT, RIGHT FRONT** There shall be an air bottle compartment located in the rear wheel well right front to house two-(2) spare SCBA cylinders. The bottom of the tubes shall be supported to eliminate breakage. The tubes are vented to facilitate moisture drainage. The compartment door shall be a stainless steel with a positive mechanical latch.		

WHEEL WELL AIR BOTTLE COMPARTMENT, RIGHT REAR There shall be an air bottle compartment located in the rear wheel well right rear to house two-(2) spare SCBA cylinders. The bottom of the tubes shall be supported to eliminate breakage. The tubes are vented to facilitate moisture drainage. The compartment door shall be a stainless steel with a positive mechanical latch. **FUEL FILL, RECESSED WITH DOOR** There shall be a cast aluminum recessed fuel fill assembly with a non-locking door mounted on the left side of the apparatus body. The fuel fill assembly shall be equipped with a fuel fill cap, retention ring and hinged door. The assembly shall be properly labeled "DIESEL FUEL ONLY". **MUD FLAPS, REAR** The rear axle mud flaps shall be constructed from hard black rubber and installed at the rear of the body fenders. **RUBRAIL** There shall be an aluminum rub rail installed on both sides of the lower body compartments. The rub rail shall be constructed from "C" channel extrusion. The aluminum rub rail shall be bolted in place with stainless steel bolts, and spaced from the fire body to provide body protection. The solid rub rail shall serve as protection to the side doors when encountering close objects. Tread plate rub rails or welded on shall not be acceptable. **REAR STEP** The 12" rear step shall be constructed of 3/16" (.1875") aluminum tread plate. The rear step shall be flanged down 2.50" and in 1.00" to maximize strength and rigidity. The rear step shall be bolted on for removal or replacement. All running board and step surfaces shall comply with NFPA 1901. **ACCESS LADDER, REAR** There shall be one-(1) Zico Quic-Ladder model 3096 with a two-rung fold-down section and six-rung main ladder section. The ladder shall be cast aluminum with a flat, non-skid surface for traction. Each step shall be 3” deep x 15-1/2” wide. The handrails shall be 1-1/4” heavy-walled aluminum tubing, covered between the rungs with ribbed black neoprene.		

TOW EYES, REAR

Two-(2) 3/4" thick rear tow eyes constructed of A-36 steel shall be mounted below the frame at the rear of the vehicle. The tow eyes shall be attached to steel weldments that are mounted to the apparatus. The eyes shall have a minimum dimension of three-(3) inches. The tow eyes shall be used for towing, not lifting the vehicle.

HANDRAIL, BELOW HOSE BED

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

HOSE BED DIVIDER(S)

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

HOSE BED COVER

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

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

The end flaps shall be secured using bungee cords and "J" hooks. The cover(s) shall completely protect the hose and prevent the hose from inadvertently deploying during normal operation.

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

The covers shall be black in color.

SHELF, PERMANENT

There shall be two (2) permanent shelf (shelves) constructed from aluminum mounted in the specified location of the compartment. Each shelf shall have a 2" lip at the front and rear for additional strength. Mount one (1) each in L3/R3 just above pump panels **SHELF, ADJUSTABLE** There shall be three (3) adjustable shelf (shelves) constructed from 3/16" (.1875) smooth aluminum. The shelf shall be approximately 0-28"W x 24-28"D. The adjustable track shall be made from aluminum extrusions. Each shelf shall have a 2" lip on all sides for additional strength. Mount three (3) forward of divider in L4 **SHELF, ADJUSTABLE** There shall be four (4) adjustable shelf (shelves) constructed from 3/16" (.1875") smooth aluminum. The shelf shall be approximately 49-60"W x 24-28"D. The adjustable track shall be made from aluminum extrusions. Each shelf shall have a 2" lip on all sides for additional strength. Mount one (1) each in L5/R5 Mount two (2) aft of divider in R6 **SHELF, ADJUSTABLE** There shall be one (1) adjustable shelf (shelves) constructed from 3/16" (.1875) smooth aluminum. The shelf shall be approximately 37-48"W x 45"D. The adjustable track shall be made from aluminum extrusions. Each shelf shall have a 2" lip on all sides for additional strength. Mount in B1 **TRAY(S), 500 POUND ROLL OUT** There shall be one (1) roll-out tray(s) supplied, constructed from 3/16" (.1875") smooth aluminum plate. The tray shall be approximately 19-36"W x 24-28"D. The tray(s) shall have a 3" lip on all sides for additional strength. The tray(s) shall be mounted on Slide Master Slides with a combined capacity of 500 pounds. Mount one (1) forward of divider on floor in L6		

TRAY(S), 500 POUND ROLL OUT There shall be one (1) roll-out tray(s) supplied, constructed from 3/16" (.1875") smooth aluminum plate. The tray shall be approximately 49-60"W x 24-28"D. The tray(s) shall have a 3" lip on all sides for additional strength. The tray(s) shall be mounted on Slide Master Slides with a combined capacity of 500 pounds. Mount one (1) on floor in R6 **TRAY(S), 500 POUND ROLL OUT** There shall be one (1) roll-out tray(s) supplied, constructed from 3/16" (.1875") smooth aluminum plate. The tray shall be approximately 37-48"W x 45"D. The tray(s) shall have a 3" lip on all sides for additional strength. The tray(s) shall be mounted on Slide Master Slides with a combined capacity of 500 pounds. Mount on floor in B1 **TOOL BOARD(S), VERTICAL ROLL OUT** There shall be four (4) vertical tool board(s) mounted in a specified compartment. Each tool board shall be manufactured from 3/16" smooth aluminum plate. The tool board(s) shall be approximately 24-28"D x full height and designed to extend 100% of the slide length. One (1) set of Grant 250# slides shall be installed per tool board. Mount two (2) aft of divider in L4 (adjustable) Mount one (1) aft of divider in L6 (adjustable) Mount one (1) to forward compartment wall in R6 **STORAGE POCKET(S), VERTICAL TOOL BOARD** There shall be five (5) 6" deep storage pocket(s) installed at the bottom of the specified vertical slide out tool boards. Mount one (1) on each side of tool boards in L4 Mount one (1) on tool board in R6 **COMPARTMENT DIVIDER(S)** Three (3) compartment divider(s) shall be mounted in the specified		

compartment. The divider shall be constructed of 3/16" (.1875") smooth aluminum plate. Mount one (1) 28" from forward wall in L4 Mount one (1) just behind chainsaw storage module in L6 Mount one (1) 12" from forward wall in R6 **CHAIN SAW MODULE - COMPARTMENT L6** There shall be chain saw storage module located in compartment L6, rear wall forward of compartment. The module shall be fabricated from 1/8" smooth aluminum and shall be painted with gray "F-Shield". The module shall be angled to allow for additional storage. The front of the module shall have two (2) lift up doors to access the additional storage area. The outside of each door shall be equipped with a fabricated saw mount and two (2) chrome dog bone handles. A storage pocket shall be provided on the right bottom of the module for the mounting of power tool spare batteries and chargers. **STORAGE MODULE - COMPARTMENT R4** There shall be a storage module located in compartment R4. The module shall be fabricated from 1/8" smooth aluminum and shall be painted with gray "F-Shield". The module shall be divided into sixteen (16) separate storage areas for storage of the following. Water rescue helmets Water life vest Little Giant ladder Ring buoys Rope throw bags Rescue rope kits **ELECTRICAL SYSTEM** BODY ELECTRICAL The body electrical system shall be designed as an integrated electrical package specifically engineered for fire apparatus application. The integrated electrical system shall be comprised of power distribution panels, which interface to the body and chassis through an engineered		

harnessing system. DISTRIBUTION PANELS The electrical distribution panels and circuits must be housed in each rear corner compartment or extrusion. The distribution panel shall incorporate a power and ground stud for connection to the internal circuits. All internal wire end terminals, including locking bulkhead connectors, shall be mechanically affixed to the wire ends by machine terminal crimping presses. No hand-crimped terminals shall be acceptable. All internal splices shall be ultrasonically welded connections - no butt style connections shall be acceptable. All internal wiring shall be of the high temperature GXL type wire and shall be protected by wiring duct wherever possible. Each side electrical distribution panel shall consist of fifteen - (15) power distribution relays. The power distribution relays shall be replaceable, SPDT automotive style, rated at a minimum of 30 amperes. The power distribution relays shall incorporate separate inputs, which are able to accept outputs from a load management system. The load management inputs must allow for the addition of a load management system before, during or after the time of delivery without requiring a rewiring of the existing distribution panel circuits. Connections to the distribution panel shall utilize Deutsch style bulkhead connectors. Screw clamp type connections are not acceptable. The distribution panel shall also contain circuit's ancillary to the required DOT signals and other body functions. The complete body electrical system shall be 100% documented and contain independent circuit diagrams with point to point wiring information, as shall as a general component diagram included in the apparatus manual. The body electrical panel shall be capable of being completely disconnected and fully tested by a computerized circuit analyzer. All electrical equipment switches shall be mounted on a switch panel mounted in the cab convenient to the driver. Light switches shall be of the marine grade rocker type with integral indicator light to show when lights are energized. All switches shall be appropriately identified.		

12-VOLT TESTING The apparatus low voltage system shall be tested and certified. A copy of certification shall be provided to the purchaser with the apparatus. Reserve Capacity Test The unit shall be run until all engines, engine compartment temperatures are stabilized and the battery system is fully charged. The engine shall be shut off and the minimum continuous electrical load be activated for ten-(10) minutes. All electrical loads shall be shutoff after ten-(10) minutes and the battery system shall then be capable of restarting the engine. Alternator Performance Test at Idle Minimum continuous electrical loads shall be activated while the unit is at idle speed. Alternator Performance Test at Full Load The total continuous electrical load shall be activated with the engine running up to the manufacturer's governed speed. The test duration shall be a minimum of two-(2) hours. Activation of the load management system shall be permitted during the test. If however, an alarm is sounded by excessive battery discharge as detected by the system or a system voltage of less than 11.8 volts DC for a 12-volt nominal system for more than 120 seconds, shall be considered a test failure. Low Voltage Alarm Test The engine shall be shut off and the total continuous electrical load shall be activated and continue to be applied until the excessive battery discharge alarm activates. The test shall be considered a failure if the alarm has not sounded within 140 seconds after the voltage drops to 11.8 volts. **EMI/RFI PROTECTION** The apparatus shall be manufactured to incorporate the latest designs in the electrical system with components that are state of the art to insure electromagnetic interference (EMI) and radio frequency interference (RFI) emissions are suppressed at the source. The apparatus shall have the ability to operate in typical fire and rescue situations with no adverse effects from EMI and/or RFI. The apparatus shall utilize components that are fully protected and wiring that utilizes shielding and loop backgrounds where required to control EMI/RFI susceptibility. The apparatus shall be bonded through ground straps. Relays and solenoids that are suspect to generating spurious		

electromagnetic radiation are diode and/or resistor protected to prevent transient voltage spikes. In order to prevent the radio frequency interference completely the purchaser shall be requested to provide a listing of the type, power output, and frequencies of all radio and bio medical equipment that is proposed to be used on the apparatus. **LIGHT(S), 8" LED COMPARTMENT** Two (2) On Scene Solutions “Access Series” 8" LED light(s) shall be provided with 15 HB, surface mount LED’s per 10” light section and produce a minimum of 200 lumens per 10” length. Each "Access Series" shall be capable of operating at a voltage of 9VDC to 14VDC. Each “Access Series” shall be cuttable in 2” increments and feature a high quality, impact resistant Lexan™ enclosure. The light stick shall be waterproof and rated at 100,000 hours of service. Each light stick shall be provided with a 5 year free replacement warranty. **LIGHT(S), 18" LED COMPARTMENT** Four (4) On Scene Solutions “Access Series” 18" LED light(s) shall be provided with 15 HB, surface mount LED’s per 10” light section and produce a minimum of 200 lumens per 10” length. Each "Access Series" shall be capable of operating at a voltage of 9VDC to 14VDC. Each “Access Series” shall be cuttable in 2” increments and feature a high quality, impact resistant Lexan™ enclosure. The light stick shall be waterproof and rated at 100,000 hours of service. Each light stick shall be provided with a 5 year free replacement warranty. **LIGHT(S), 24" LED COMPARTMENT** Four (4) On Scene Solutions “Access Series” 24" LED light(s) shall be provided with 15 HB, surface mount LED’s per 10” light section and produce a minimum of 200 lumens per 10” length. Each "Access Series" shall be capable of operating at a voltage of 9VDC to 14VDC. Each “Access Series” shall be cuttable in 2” increments and feature a high quality, impact resistant Lexan™ enclosure. The light stick shall be waterproof and rated at 100,000 hours of service. Each light stick shall be provided with a 5 year free replacement warranty. **LIGHT(S), 36" LED COMPARTMENT**		

Four (4) On Scene Solutions “Access Series” 36" LED light(s) shall be provided with 15 HB, surface mount LED’s per 10” light section and produce a minimum of 200 lumens per 10” length. Each "Access Series" shall be capable of operating at a voltage of 9VDC to 14VDC. Each “Access Series” shall be cuttable in 2” increments and feature a high quality, impact resistant Lexan™ enclosure. The light stick shall be waterproof and rated at 100,000 hours of service. Each light stick shall be provided with a 5 year free replacement warranty. **LIGHT(S), 54" LED COMPARTMENT** Twelve (12) On Scene Solutions “Access Series” 54" LED light(s) shall be provided with 15 HB, surface mount LED’s per 10” light section and produce a minimum of 200 lumens per 10” length. Each "Access Series" shall be capable of operating at a voltage of 9VDC to 14VDC. Each “Access Series” shall be cuttable in 2” increments and feature a high quality, impact resistant Lexan™ enclosure. The light stick shall be waterproof and rated at 100,000 hours of service. Each light stick shall be provided with a 5 year free replacement warranty. **DOOR AJAR SWITCHES** All apparatus body doors shall be provided with an auto door switch. These switches shall operate the compartment interior lights and activate the door ajar indicator on each side of apparatus body when the door is opened. There shall be a red door ajar light mounted in the cab, in view of the driver to indicate an unsecured door. There shall be a buzzer mounted in the cab that shall alert the driver. **LIGHTS, ZONE B/D UPPER FRONT BODY** Two-(2) Whelen M9 Series Super-LED model M9RC shall be installed, one-(1) each side of the upper front corner of the body. The warning light shall incorporate red Super-LEDs, a clear non-optic hard coated polycarbonate lens, clear optic collimator and utilize a metalized reflector for maximum output. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The encapsulated lens/reflector assembly and conformal coated PC board shall provide additional protection against environmental elements. The solid state warning lights shall be vibration resistant. The self-contained flashing light shall have 164 Scan-Lock flash patterns including synchronize feature and steady burn. The warning light is covered by a five year factory warranty. The surface mount module includes a M9FC chrome flange and hardware for horizontal mounting.		

LIGHTS, ZONE B/D UPPER REAR BODY Two-(2) Whelen M9 Series Super-LED model M9RC shall be installed, one-(1) each side of the upper rear corner of the body. The warning light shall incorporate red Super-LEDs, a clear non-optic hard coated polycarbonate lens, clear optic collimator and utilize a metalized reflector for maximum output. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The encapsulated lens/reflector assembly and conformal coated PC board shall provide additional protection against environmental elements. The solid state warning lights shall be vibration resistant. The self-contained flashing light shall have 164 Scan-Lock flash patterns including synchronize feature and steady burn. The warning light is covered by a five year factory warranty. The surface mount module includes a M9FC chrome flange and hardware for horizontal mounting. **LIGHTS, ZONE C UPPER OUTBOARD** Two-(2) Whelen M6 Series Super-LED model M6RC shall be installed, one-(1) each side on the upper rear of the apparatus in the outboard position. The warning light shall incorporate red Super-LEDs, a clear non-optic hard coated polycarbonate lens, clear optic collimator and utilize a metalized reflector for maximum output. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The encapsulated lens/reflector assembly and conformal coated PC board shall provide additional protection against environmental elements. The solid state warning lights shall be vibration resistant. The self-contained flashing light shall have 164 Scan-Lock flash patterns including synchronize feature and steady burn. The warning light is covered by a five year factory warranty. The surface mount module includes a M6FC chrome flange and hardware for horizontal mounting. **LIGHTS, ZONE C MIDDLE OUTBOARD** Two-(2) Whelen M6 Series Super-LED model M6RC shall be installed, one-(1) each side on the middle rear of the apparatus in the outboard position. The warning light shall incorporate red Super-LEDs, a clear non-optic hard coated polycarbonate lens, clear optic collimator and utilize a metalized reflector for maximum output. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The encapsulated lens/reflector assembly and conformal coated PC board shall provide additional protection against environmental elements. The solid state warning lights shall be vibration resistant. The self-contained flashing light shall have 164 Scan-Lock flash patterns including synchronize feature and steady burn. The warning light is covered by a		

five year factory warranty. The surface mount module includes a M6FC chrome flange and hardware for horizontal mounting. **LIGHTS, ZONE B/D MIDSHIP LOWER** Two-(2) Whelen M6 Series Super-LED model M6R lights shall be installed, one-(1) each side midship of the apparatus. The warning light shall incorporate red Super-LEDs, a red non-optic hard coated polycarbonate lens, clear optic collimator and utilize a metalized reflector for maximum output. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The encapsulated lens/reflector assembly and conformal coated PC board shall provide additional protection against environmental elements. The solid state warning lights shall be vibration resistant. The self-contained flashing light shall have 164 Scan-Lock flash patterns including synchronize feature and steady burn. The warning light is covered by a five year factory warranty. The surface mount module includes a M6FC chrome flange and hardware for horizontal mounting. **LIGHTS, ZONE B/D REAR LOWER** Two-(2) Whelen M6 Series Super-LED model M6R lights shall be installed, one-(1) each side rearward portion of the apparatus. The warning light shall incorporate red Super-LEDs, a red non-optic hard coated polycarbonate lens, clear optic collimator and utilize a metalized reflector for maximum output. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The encapsulated lens/reflector assembly and conformal coated PC board shall provide additional protection against environmental elements. The solid state warning lights shall be vibration resistant. The self-contained flashing light shall have 164 Scan-Lock flash patterns including synchronize feature and steady burn. The warning light is covered by a five year factory warranty. The surface mount module includes a M6FC chrome flange and hardware for horizontal mounting. **LIGHTS, ZONE C LOWER** Two-(2) Whelen M6 Series Super-LED model M6R shall be installed, one-(1) each side on the lower rear of the apparatus. The warning light shall incorporate red Super-LEDs, a red non-optic hard coated polycarbonate lens, clear optic collimator and utilize a metalized reflector for maximum output. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The encapsulated lens/reflector assembly and conformal coated PC board shall provide additional protection against environmental elements. The solid state warning lights shall be vibration resistant. The self-contained flashing		

light shall have 164 Scan-Lock flash patterns including synchronize feature and steady burn. The warning light is covered by a five year factory warranty. **STOP, TURN AND BACK-UP LIGHTS** Stop, turn and backup lights shall be Whelen M6 Series, individual fixtures. Fixtures shall be mounted on each rear face of the body recessed in model M6FCV3, highly polished, aluminum trim ring. The red stop (LED) light shall be model M6BTT, the turn light shall be a model M6T amber (LED) type with directional arrow, and the backup light shall be a white (LED) model M6BUW. **LIGHT, REAR DIRECTIONAL** A Whelen Traffic Advisor model TAM63 shall be provided. The traffic advisor shall incorporate a rectangular extruded black aluminum chassis with six amber TIR3™ Super-LED® lights. The TIR3 lights shall be installed in a clear optic hard coated polycarbonate lens housing. The TIR3 lights shall incorporate three amber Super-LEDs, a clear horizontal optic hard coated polycarbonate lens housing, and utilize a TIR reflector for maximum output. The hard coated lens housing shall provide extended life/luster protection against UV and chemical stresses. The encapsulated TIR3 lens/reflector assembly and conformal coated PC board shall provide additional protection against environmental elements. The solid state traffic advisor shall be vibration resistant. The TAM63 shall include model TACTLD1 control head that includes remote flash control. The TACTLD1 shall have four programmable directional sequence flash patterns of left, right, split, and flash. The TACTLD1 includes an auxiliary flash option when attached to +12v DC to flash the traffic advisor. The LED display on the control head shall replicate the TAM63 directional sequence. The traffic advisor control head shall have a rear panel dip switch for the ability to set eight additional Scan-Lock™ flash patterns. The TAM63 will contain a 15’ interconnecting cable with quick disconnect feature. The LED modules are covered by a five year factory warranty. The TAM63 shall have for mounting rear PEM nuts/thu-bolt end caps with. The rear directional light shall be recessed mounted in the body. **CLEARANCE LIGHTS AND REFLECTORS** Clearance lights and reflectors shall be LED lights, which include (2) red marker lights, (4) red rectangular reflectors, (2) amber rectangular reflectors and (1) red three light cluster recessed in the rear step.		

LIGHTS, BRITAX END/CORNER LED Two-(2) Britax model 427 (12V) LED rubber mounted angled clearance lights shall be mounted, one-(1) each side on the rear corners of the apparatus body. The lights shall be wired to the chassis clearance and marker lights. The lens color shall be red/amber. **LIGHTS, UNDERBODY** Six-(6) Whelen model T0CACCCR 2" (5mm) LED underbody "Ground Effect" lights shall be installed at a location to be determined during the pre-construction conference. The underbody lights shall illuminate the ground beneath the fire apparatus. The lights shall have a clear lens. **LIGHT, LICENSE PLATE** A Whelen OS Series LED model 0SC0EDCR shall be provided at the rear of the apparatus to illuminate the license plate. The steady burn illumination light shall incorporate three clear LED and a clear non-optic hard coated polycarbonate lens. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The encapsulated assembly shall provide protection against environmental elements. The solid state illumination light shall be vibration resistant. An installation kit including mounting hardware, neoprene gasket and 45 degree angle chrome housing shall be provided for surface mounting. The 0AC0EDCR will contain a 12” non-terminated pigtail. The illumination light meets SAE J592 requirements and is covered by a five year factory warranty. **LIGHT(S), LED PERIMETER ILLUMINATION** Seven (7) Whelen 3” Round Super-LED® model 3SC0CDCR perimeter illumination light(s) shall be provided. The steady burn illumination light shall incorporate six clear Super-LED and a clear non-optic hard coated polycarbonate lens for maximum output. The hard coated sealed lens shall provide extended life/luster protection against UV and chemical stresses. The light shall be wet sealed and vacuum tested to ensure proper sealing. The conformal coated PC board, powder coated die cast housing, and exterior rubber gasket shall provide additional protection against environmental elements. The 3SC0CDCR shall provide 360 usable lumens. The solid state illumination light shall be vibration resistant. The 3SC0CDCR will contain a 6" unterminated pigtail. The illumination light is covered by a five year factory warranty. The 3SC0CDCR requires a ¾”		

wire entry hole in the body of the vehicle and includes mounting screws and grommet. Mount two (2) in dunnage area Switch lights with "Step Lights" Mount one (1) on forward bulkhead of hosebed Switch light from pump panel labeled "Hosebed Light" Mount one (1) at landing area on top of body and three (3) on rear of body for use with access ladder. Switch lights with "Step Lights" **LIGHT, DRIVER/PASSENGER'S SIDE BROW** Two-(2) brow lights shall be installed on the front cab roof, one-(1) on the driver's and one-(1) on the passenger's side. The mounting brackets shall be attached to the bottom of the lamp head and be machined to conform to the roof radius. Wiring shall extend from a weatherproof strain relief at the rear of the lamp head. Two (2) Whelen Pioneer Plus Model PFP1 light head(s) shall be provided. The 75 watt +12v DC Pioneer lighthead(s) shall incorporate Super-LED single flood light installed in a die-cast white powder coated aluminum housing. The PFP1 configuration shall consist of 30 white Super-LEDs, a clear optic collimator/metalized reflector assembly and a clear non-optic polycarbonate lens. The Pioneer flood light shall have 8,100 usable lumens. The lens/reflector assembly shall utilize a liquid injected molded silicone gasket to be resistant to water, moisture, dust, and other environmental conditions. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The PFP1 shall be shall be vibration resistant. The Pioneer PC boards shall be conformal coated for additional protection. Two breathable membrane patches shall be installed to the bottom of the housing to maintain a consistent internal pressure. The PFP1 shall have extended LED operation with low current consumption and low operating temperature. The Pioneer light shall be SAE 1113-42 compliant and Class 5 testing for EMI. The PFP1 is covered by a five year factory warranty. The cab mounted brow light(s) shall be controlled by a light switch located in the cab labeled BROW LIGHT.		

LIGHTS, RECESSED SIDE OF CAB There shall be a recessed light shall be installed on the side of the cab between the front and rear doors. Two (2) Whelen Pioneer Plus Model PFP2 light head(s) shall be provided. The light(s) shall be installed in a PBA203 semi recessed chrome 15° housing. The wiring shall extend from a weatherproof strain relief at the rear of the lamp head. The 168 watt +12v DC Pioneer lighthead shall incorporate Super-LED® dual flood light installed in a die-cast white powder coated aluminum housing. The PFP2 configuration shall consist of 60 white Super-LEDs with a clear optic collimator/metalized reflector assembly and a clear non-optic polycarbonate lens. The Pioneer flood light shall have 16,000 usable lumens. The lens/reflector assembly shall utilize a liquid injected molded silicone gasket to be resistant to water, moisture, dust, and other environmental conditions. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The PFP2 shall be shall be vibration resistant. The Pioneer PC boards shall be conformal coated for additional protection. Two breathable membrane patches shall be installed to the bottom of the housing to maintain a consistent internal pressure. The PFP2 shall have extended LED operation with low current consumption and low operating temperature. The Pioneer light shall be SAE 1113-42 compliant and Class 5 testing for EMI. The PFP2 is covered by a five year factory warranty. The cab mounted recessed scene lights shall be controlled by individual scene light switches located in the cab labeled LEFT SCENE and RIGHT SCENE. **LIGHTS, RECESSED CENTER OF BODY** There shall be a recessed light shall be installed on the side of the body, centered. Two (2) Whelen Pioneer Plus Model PFP2 light head(s) shall be provided. The light(s) shall be installed in a PBA203 semi recessed chrome 15° housing. The wiring shall extend from a weatherproof strain relief at the rear of the lamp head. The 168 watt +12v DC Pioneer lighthead shall incorporate Super-LED® dual flood light installed in a die-cast white powder coated aluminum housing. The PFP2 configuration shall consist of 60 white Super-LEDs with a clear optic collimator/metalized reflector assembly and a clear non-optic polycarbonate lens. The Pioneer flood light shall have 16,000 usable lumens.		

The lens/reflector assembly shall utilize a liquid injected molded silicone gasket to be resistant to water, moisture, dust, and other environmental conditions. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The PFP2 shall be shall be vibration resistant. The Pioneer PC boards shall be conformal coated for additional protection. Two breathable membrane patches shall be installed to the bottom of the housing to maintain a consistent internal pressure. The PFP2 shall have extended LED operation with low current consumption and low operating temperature. The Pioneer light shall be SAE 1113-42 compliant and Class 5 testing for EMI. The PFP2 is covered by a five year factory warranty. The center body mounted recessed light(s) shall be controlled by a switch located in the cab. **LIGHTS, TELESCOPING REAR OF BODY** There shall be one-(1) telescoping LED light installed on the rear of the body, driver side. One (1) Whelen Pioneer Plus Model PFP1 light head(s) shall be provided. The 75 watt +12v DC Pioneer lightheads shall incorporate Super-LED single flood light installed in a die-cast white powder coated aluminum housing. The PFP1 configuration shall consist of 30 white Super-LEDs, a clear optic collimator/metalized reflector assembly and a clear non-optic polycarbonate lens. The Pioneer flood light shall have 8,100 usable lumens. The lens/reflector assembly shall utilize a liquid injected molded silicone gasket to be resistant to water, moisture, dust, and other environmental conditions. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The PFP1 shall be shall be vibration resistant. The Pioneer PC boards shall be conformal coated for additional protection. Two breathable membrane patches shall be installed to the bottom of the housing to maintain a consistent internal pressure. The PFP1 shall have extended LED operation with low current consumption and low operating temperature. The PFP1 is covered by a five year factory warranty. A Whelen 3000 series Pole System shall be provided. The telescopic side mount pole assembly shall incorporate 57" internal aluminum alloy pole with an outer diameter of 1.125" and an inner diameter of 0.875". The 3000 series pole shall also include a 12" bottom mount silver aluminum alloy collar/handle assembly. The outer body shall meet NFPA 1901 “15.8” access hand rails and hand held guidelines. The pole shall slide on		

a Teflon “O” ring and collar to reduce friction during movement. The upper body shall contain a polycarbonate sleeve to prevent water, moisture, dust, and other environmental conditions from entering the interior of the pole assembly. The aluminum side mount brackets shall be powder coated silver. The side mount brackets shall contain two types of mounting gaskets; 1/16” for painted surfaces and 1/8” for diamond plated surfaces. Both gaskets shall be a 40 durometer neoprene black rubber with PSA on one side. All mounting hardware shall be stainless steel. The internal coil cord cable shall be UL© listed and have a Heyco® liquid tight strain relief. All aluminum pole components shall be clear anodized to eliminate yellowing and corrosion. **SWITCH(ES), HAZARD LIGHT** One (1) raised pole hazard light switch(es) shall be installed. The magnetic switch shall be housed within the light pole mounting flange. A magnet shall be mounted in the extension pole. The switch contacts shall close when the pole is raised. The telescoping light(s) shall be controlled by a scene light switch located in the cab and rear of body labeled REAR SCENE and when the transmission is placed into reverse. **COMMAND LIGHT - KNIGHT 2 - KL415-LED** The apparatus shall be equipped with one (1) all electric floodlight tower. The unit shall not require tapping into vehicle braking system to be operated, eliminating the chance for vehicle brake problems. Hydraulic or pneumatic type floodlights are not acceptable alternatives to the all-electric light tower specified. The light tower shall be capable of overhanging the side (or back) of the vehicle to provide maximum illumination and a warming area adjacent to the vehicle. The light tower shall have four (4) weatherproof, 150 watt, 12 volt LED Pioneer Plus light heads with a light output of 48,000 lumens requiring 60 amps 12VDC. Light heads shall be mounted in three (2) pairs, giving two (2) vertical lines of two (2) when the lights are in the upright position. The light tower shall have slip-rings for a full 360 rotation. Further the tower shall be capable of rotating either direction from a stowed position. Light tower shall be controlled with a hand-held umbilical line remote control. The storage station for the remote control unit shall be equipped with a button to activate the "Auto-Park" automatic nesting feature.		

The controls on the remote box shall be:

1. Two (2) switches, one (1) for each light bank
2. One (1) light bank rotation switch
3. One (1) switch for elevating lower stage
4. One (1) switch for elevating upper stage
5. One (1) indicator light to indicate when light bank is out of roof nest position
6. One (1) indicator light to indicate when light bank is rotated to proper nest position

The controls shall be located per Fire Department instructions.

The tower base shall have a light the illuminates the envelope of motion during any movements of the light tower mast.

The light tower shall have a full extension over 7 feet from mounted position and extend from nest position to full upright in 15 seconds. The overall size of nested light tower shall be approximately 33" wide x 47" long x 13" high, and weight approximately 120 lbs.

The light tower shall be all aluminum construction, with stainless steel shafts and bronze bushings for long life and low maintenance.

SHIELD, LIGHT TOWER

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

BODY PAINT FINISH, SINGLE COLOR

The body exterior shall have no mounted components prior to painting to assure full coverage of metal treatments. Box pan compartment doors shall be painted separately to assure proper paint coverage on body, doorjambs, and door edges.

All painted surfaces shall follow the following procedure to insure a lasting finish:

- Metal surfaces shall be sanded to remove all burrs and imperfections, before etching and treatment.
- A wax & grease solvent shall be used to clean and prep the aluminum surface. The surface shall then be rinsed with fresh water. This step removes wax, grease and other surface contaminants, thus leaving a bright, clean, and conditioned

surface.

- A self-etching, metal primer shall be applied next. The self-etching primer shall fill all of the minor imperfections, scratches, etc. in the metal. This step produces a corrosion resisting conversion coating that prevents off oxidation and other surface contaminants leaving a surface that gives excellent paint adhesion.
- A sandable primer shall be sprayed on the metal that seals the surface for the polyurethane paint. A minimum coating thickness of 2 MIL shall be applied. Primer is then sanded smooth leaving the best surface for topcoat.
- The apparatus body shall then be painted with a minimum of three-(3) coats of color.

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

BODY PAINT COLOR/CODE

The apparatus body paint code shall be Red, 854008.

PAINT, INTERIOR COMPARTMENT

The interior of the body compartments shall be painted with "F-Shield".

"F-Shield" is a 100% solids, state-of-the art, VOC-free, plural-component, pure polyuria elastomeric membrane. This seamless system exhibits extraordinary performance characteristics. F-Shield is based on amine-terminated polyether resins, amine chain extenders and MDI pre-polymers. This membrane achieves an extremely tough, flexible, chemical and abuse resistant finish. F-Shield shall be used in specified areas for maximum protection.

PAINT, INTERIOR COMPARTMENT

The interior and exterior surfaces of all shelves, trays, toll boards, and dividers in the body compartments shall be painted with "F-Shield".

"F-Shield" is a 100% solids, state-of-the art, VOC-free, plural-component, pure polyuria elastomeric membrane. This seamless system exhibits extraordinary performance characteristics. F-Shield is based on amine-terminated polyether resins, amine chain extenders and MDI pre-polymers. This membrane achieves an extremely tough, flexible, chemical and abuse resistant finish. F-Shield shall be used in specified areas for maximum protection.

SCOTCHLITE STRIPE

There shall be a 6" Scotchlite stripe located on the apparatus cab and body. The stripe shall cover a minimum of fifty percent (50%) of the cab, body sides and of the rear of the apparatus. The stripe shall also cover twenty-five percent (25%) of the front of the apparatus. The stripe shall be installed to meet the current NFPA requirements.

The striping shall be red in color.

The striping shall be white in color.

The reflective stripe shall run straight from the headlights to the rear cab doors with a "S" design and run to the rear of the body on each side of the apparatus.

CAB PAINT BREAK STRIPE

There shall be a 3/4" Spun Gold stripe with applied to the chassis paint break line. The stripe shall have a 1/8" black pinstripe above and below the 3/4" stripe.

STRIPE, REAR CHEVERON

A minimum of fifty percent of the rear vertical surface of the unit shall be overlaid with a reflective material, installed in an alternating "Chevron" pattern (sloping down and away from the centerline) at a 45-degree angle. Each stripe shall be 6” wide and the colors of stripping shall be in compliance, with the current edition of NFPA 1901.

The Chevron striping shall be 3M red and lime green.

LETTERING

There shall be a maximum of sixty (60) 3" tall Spun Gold letters applied to the apparatus. The lettering shall also have a one color shade applied.

EXTRA LETTER(S), 12"

There shall be thirty (30) 12" tall Scotchlite letters applied to the apparatus. Lettering color and shading to match original letters.

LADDER(S), 10' FOLDING

There shall be one (1) Alco-Lite Model FL-10, 10' folding ladder(s) provided with the apparatus. The ladder(s) shall be aluminum, single-

section with rubber feet. The ladder(s) shall meet or exceed the latest NFPA standards. **LADDER(S), 14' ROOF** There shall be one (1) Alco-Lite model PRL-14, 14' roof ladder(s) supplied with the apparatus. The ladder(s) shall be aluminum, single-section with folding steel roof hooks on one end and steel spikes at the other. The ladder(s) shall meet or exceed the latest NFPA standards. **LADDER(S), 24' 2-SECTON EXTENSION** There shall be one (1) Alco-Lite model PEL-24, 24' two-section ladder(s) supplied with the apparatus. The extension ladder(s) shall be aluminum with steel spurs on one end. The ladder(s) shall meet or exceed the latest NFPA standards. **30 DEGREE ELBOW(S) - 3" FNST X 4" STORZ** There shall be one (1) Kochek model SKE43R, 3" FNST rocker lug x 4" Storz, adapter supplied with the apparatus. The elbow(s) shall have a 30-degree turn down. **CAP(S), 4" STORZ** There shall be one (1) Kochek model CC407, 4" Storz cap(s) with chain provided with the apparatus. **MONITOR** An Akron Brass item 3433, Hi-Riser portable ground base monitor with two clappered swivel inlets, direct mount, 3488 playpipe and 2499 tips shall be provided. shall be provided. Base shall have folding legs with no locking mechanism required to keep legs in place. The monitor shall have handwheel elevation control from 90° above to 45° below horizontal with an elevation safety stop 35° above horizontal; 360° continuous rotation in the deck mode flowing 1250 gpm and 180° in the portable mode flowing 800 gpm; horizontal locking mechanism and stops to prevent accidental over rotation; 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 flange. The monitor shall also include a pressure gauge, carry handle, grease fittings, safety chain, carbide tip ground spikes and Pyrolite® construction. Deck mount not to exceed 15 1/4" in he stowed position. Liftoff weight: 31 lbs. base weight: 32 lbs.		

HANDLIGHT(S), STREAMLIGHT FIRE VULCAN Four (4) waterproof Streamlight Fire Vulcan series light(s), part number 44451, shall be provided. The light(s) shall have a orange high-impact ABS thermoplastic housing, rubberized impact bumper, lens ring, shoulder strap and cushioned-grip handle. The light(s) shall contain C4 LED technology and taillight LEDs that operate in blinking and steady modes. The LED bulb shall be provide up to 80,000 peak beam candlepower rated at 145 lumens. Ultra bright blue tail light LED's are provided to make certain you can be seen even in thick smoke. The Lithium-Ion rechargeable cells recharge in 5 hours and provides run times up to 3 hrs. with steady High LED & taillights in operation. The vehicle-mounted direct-wire charging rack(s) shall be wired direct to the batteries of the 12-volt DC system on the apparatus. **WARRANTY, BODY PARTS & LABOR** There shall be a two-(2) year extended body mechanical parts and labor warranty provided with the apparatus. The apparatus shall be free of defects in material and workmanship for a warranty period of two-(2) year after the date on which the apparatus is first delivered to the original purchaser. **WARRANTY, CAB/CHASSIS PARTS & LABOR** The manufacturer shall provide a limited parts and labor warranty to the purchaser of the cab and chassis for a period of two-(2) year, or the first 24,000 miles, whichever occurs first. The warranty period shall commence on the date the vehicle is delivered to the end user. **WARRANTY, CAB STRUCTURAL** The cab structure shall be warranted for a period of ten-(10) years or one hundred thousand (100,000) miles which ever may occur first. The warranty period shall commence on the date the vehicle is delivered to the end user. **WARRANTY, BODY STRUCTURAL** There shall be a ten-(10) year body warranty on each new fire body/heavy-duty rescue apparatus. The bodies are to be free of structural failures caused by defective design or workmanship for a warranty period of ten-(10) years after the date on which the vehicle is first delivered to the original purchaser or 100,000 miles, whichever occurs first.		

WARRANTY, CAB PAINT

The cab and chassis shall be covered by a limited manufacturer paint warranty which shall be in effect for ten-(10) years from the first owner's date of purchase or in service or the first 100,000 actual miles, whichever occurs first. The warranty period shall commence on the date the vehicle is delivered to the end user.

WARRANTY, BODY PAINT/CORROSION

There shall be a four-(4) year paint/corrosion warranty provided. This warranty shall cover perforation, blistering, peeling, or any other adhesion defects caused by defective manufacturing methods, or material selections, for a warranty period of four-(4) years or 100,000 miles which occurs first, after the date of which the vehicle is first delivered to the original purchaser.

WARRANTY, FRAME RAIL

The chassis frame and cross members shall be provided with a lifetime material and workmanship limited warranty to the original purchaser. The warranty shall cover the chassis frame and cross members as being free from defects in material and workmanship that would arise under normal use and service.

Proposals offering warranties for frames not including cross members shall not be considered.

WARRANTY, MERITOR AXLE

FRONT AXLE

The front axle shall be warranted by Meritor for two-(2) years with unlimited miles under the general service application.

REAR AXLE

The rear axle shall be warranted by Meritor for two-(2) years with unlimited miles under the general service application.

WARRANTY, DEISEL ENGINE

The Cummins engine shall be warranted for a period of five-(5) years or 100,000 miles, whichever occurs first.

WARRANTY, TRANSMISSION

The Allison EVS series transmission shall be warranted for a period of five-(5) years with unlimited mileage. Parts and labor shall be included in the warranty.

WARRANTY, ANTI LOCK BRAKE SYSTEM

The ABS brake system shall be warranted for a period of three-(3) years/300,000 miles.

WARRANTY, HALE FIRE PUMP

EXPRESS WARRANTY
Hale Products, Incorporated ("Hale") hereby warrants to the original buyer that products manufactured by Hale are free of defects in material and workmanship for a period of five-(5) years from the date the product is first placed into service or five and one-half (5-1/2) years from date of shipment by Hale, whichever period shall be first to expire. Within this warranty period Hale will cover parts and labor for the first two-(2) years and parts only for years three (3) through five (5).

LIMITATIONS
HALE'S obligation is expressly conditioned on the Product being:

- Subjected to normal use and service
- Properly installed and maintained in accordance with HALE'S Instruction Manual and Industry Standards as to recommended service and procedures
- Not damaged due to abuse, misuse, negligence, or accidental causes
- Not altered, modified, serviced (non-routine), or repaired other than by an Authorized Service facility
- Manufactured per design and specifications submitted by the original buyer
- Used with an appropriate engine as determined by the engine manufacturers published data
- Excluded are normal wear items identified as but not limited to packing, strainers, anodes, filters, light bulbs, intake screens, wear rings, mechanical seals, etc.

WARRANTY, PLUMBING SYSTEM

There shall be a ten-(10) year pump plumbing warranty provided. The warranty covers all plumbing components used in construction of the fire apparatus water/foam plumbing system against defects and workmanship,

provided the apparatus is used in a normal and reasonable manner. The warranty is extended only to the original user-purchaser for a period of 10 years from the date of delivery. **WARRANTY, WATER TANK** The poly tank manufacturer warrants each tank to be free from manufacturing defects in material and workmanship for the service life of the original vehicle (vehicle must be actively used in fire suppression). The warrant is transferable, with written approval of the manufacturer. Each tank is inspected and tested for leaks prior to leaving the manufacturing facility. The tank shall be installed in the vehicle in accordance to the manufacture's guidelines. There are no warranties, expressed or implied, which extend beyond the description of the face hereof. There is no expressed or implied warranty of merchantability or a warranty of fitness for a particular purpose. Additional, this warranty is in lieu of all other obligations or liabilities on the part of the Manufacturer. **MANUAL, CHASSIS OPERATION** There shall be two-(2) digital copies of the chassis operation manual provided with the chassis. The digital data shall include a parts list specific to the chassis model. **MANUALS, ENGINE AND TRANSMISSION OPERATION** There shall be two-(2) printed hard copy sets of the engine operation manual and two-(2) printed hard copy sets of the transmission operation manual specific to the model ordered included with the chassis. **MANUALS, APPARATUS BODY** The contractor shall supply, at time of delivery, at two-(2) sets of complete operation and service documentation covering the completed apparatus as delivered and accepted. The documentation shall address at least the inspection, service, and operations of the fire apparatus and all major components thereof. **MANUALS, FIRE PUMP** There shall be two-(2) copies of pump manuals provided to the		

department. **WIRING DIAGRAMS, CAB/CHASSIS** There will be a complete digital set of electrical schematics provided at the time of delivery. These schematics will have each circuit properly numbered and in color. The schematic will show each connector in the circuitry and the position in which each circuit enters, exits, or terminates. The schematic will be drawn in such a manner as to allow individual circuitry to be followed throughout the apparatus. These schematics will not have the circuitry condensed into a single line or sets of lines. Multiple sheets will be acceptable so long as each of the harnesses is properly identified to the connecting sheet and harness. There will be a border around the paper(s), which contain alpha and numeric characters for indexing coordinate reference. There will be an indexing or part reference document for quick location of items shown on the schematics. **WIRING DIAGRAMS, APPARATUS BODY** There will be a complete set of generic electrical schematics provided at the time of delivery. These schematics will have each circuit properly numbered and in color. The schematic will show each connector in the circuitry and the position in which each circuit enters, exits, or terminates. The schematic will be drawn in such a manner as to allow individual circuitry to be followed throughout the apparatus. These schematics will not have the circuitry condensed into a single line or sets of lines. Multiple sheets will be acceptable so long as each of the harnesses is properly identified to the connecting sheet and harness. There will be a border around the paper(s), which contain alpha and numeric characters for indexing coordinate reference. There will be an indexing or part reference document for quick location of items shown on the schematics. This document will refer the user to the appropriate drawing and page number and to sections of the drawing(s) by the means of letter and number coordinates. The schematic will show all harnesses used in the apparatus cab, chassis and body that is supplied by the chassis and body manufacturer.		

Modifications to the manufactured standard harnesses are to be documented and properly indexed for quick identification. A complete wire number, color, and function listing will accompany the schematics.		