

**CITY OF KENOSHA
KENOSHA FIRE DEPARTMENT
ONE (1) NEW AERIAL LADDER FIRE RESCUE UNIT
PROPOSAL NOTICE #03-20**

ISSUED: Wednesday, February 25, 2020

Sealed proposals will be accepted by the City of Kenosha, in the Department of Finance, Municipal Office Building, 625 52nd Street, Room 208, Kenosha, WI. 53140 until Tuesday, March 31, 2020 at 2:30 P.M. for the provision and delivery of the following fire apparatus, all in accordance with City of Kenosha standard terms and conditions, and the specifications contained herein:

One (1) New Aerial Ladder Fire Rescue Unit

Proposals must be sealed and submitted on the attached form accompanying this proposal and returned clearly marked as to project description and number along with the scheduled date and time of the public opening. Proposals received after the date and time of opening will not be considered. All proposals shall be submitted in a sealed envelope carrying the following information: proposing firm's name, firm address, proposal description, proposal notice number and date and time of proposal opening. Proposals submitted via facsimile or through other electronic means will not be accepted.

Vendors shall furnish complete manufacturer specifications and manufacturers descriptive literature describing in detail the equipment that is proposed. Vendors shall answer all questions on the accompanying specification section. All inquiries in the specification section shall be answered completely. Any questions regarding these specifications should be directed to Mr. William Thomas, KFD Mechanic Supervisor at 262-925-5848. Inquiries regarding the proposal process and the submittal can be directed to the Finance Department at 262-653-4180.

The City of Kenosha reserves the right to award contract to the most qualified proposer. The City reserves the right to accept or reject any or all proposals or to accept any proposal that is considered the most advantageous to the City of Kenosha.

The City of Kenosha is exempt from from Federal Excise Tax and State Sales Tax, therefore, proposals should be made exclusive of these taxes. A Tax Exemption Certificate will be furnished to the successful vendor.

State delivery date on the proposal form or the number of days from receipt of a purchase order.

Delivery is F.O.B. Destination to the City of Kenosha, to the following address:

Kenosha Fire Departmentent – Station 4
4810 60th Street
Kenosha, WI.

Award will be made within thirty (30) days of scheduled opening to the lowest responsive and responsible vendor meeting or exceeding City of Kenosha Fire Department specifications, providing proposals are received within budgetary amounts.

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WIRING SCHEMATIC

A USB flash drive containing wiring diagrams of the apparatus shall be provided at the time of delivery.
NO EXCEPTIONS

SINGLE SOURCE CUSTOM CHASSIS

A single source manufactured Severe Duty Cab and Chassis system shall be provided. The chassis shall be manufactured in the factory of the bidder. The chassis shall be designed and manufactured for heavy duty service with adequate strength and capacity of all components for the intended load to be sustained and the type of service required. The cab and chassis system, shall be considered the bidders "Top of the Line".

There shall be no divided responsibility in the production of the apparatus. **NO EXCEPTIONS**

WHEELBASE

The approximate wheelbase shall allow for adequate maneuvering of the apparatus but should not exceed 253".

DOUBLE FRAME RAILS/TANDEM AXLES

The chassis frame shall be of a ladder type design utilizing industry accepted engineering best practices. The frame shall be specifically designed for fire apparatus use.

Each frame rail shall be constructed of two .375" thick-formed channels. The outer channel shall be 10.188" x 3.50" x .375" and the inner channel (liner) shall be 9.31" x 3.13" x .375".

The section modulus shall be 31.8 in.³. The resistance to bending moment (RBM) over the entire rail will be at least 3,498,000 in. /lbs.

The cross-members shall be constructed of minimum 3/8" formed channels and have formed gusseted ends at the frame rail attachment. Tandem suspensions will use a multi-piece bolt assembled "butterfly" cross-member configuration. This cross-member will span the entire rear of the vehicle.

Each rail is media blasted to remove scale, oil, and contaminants. This blasting also ensures paint adhesion. Each rail will be primed with Cathacoat 302HB, a high performance, two component, reinforced inorganic zinc-rich primer with proven cathodic protection of steel structures, prior to assembly.

.625 inch, grade 8 flange, Huck bolt fasteners shall be used on all permanently attached brackets to the frame to eliminate the need for bolt re-tightening.

A lifetime warranty shall be provided, per manufacturer's written statement.

The lifetime warranty shall not exclude use in areas where salt and deicers are used on the roadway (Kenosha, WI). The lifetime warranty shall also be considered the true lifetime of the apparatus must not be less than 30 years. Galvanized style coatings shall not be acceptable unless they are demonstrated to be of complete multiple coats, at least 3. **NO EXCEPTIONS**

FRONT TOW EYES, BELOW BUMPER

There shall be two front tow eyes with 3" diameter holes attached directly to the chassis frame, accessible below the front bumper.

TOW EYES, PAINTED FINISH

The front tow eyes shall be painted to match the color of the chassis frame.

REAR TOW EYES

There shall be two tow eyes attached directly to the chassis frame rail and shall be chromate acid etched for superior corrosion resistance and painted to match the chassis.

STEERING

The steering system shall be a TRW wheel to wheel steering system that is tested and certified by TRW, consisting of a heavy duty TRW/Ross Model TAS-85 power steering gear, TRW PS36 steering pump, miter box, drag links, and a thermostatic controlled fan cooled system (set point 185 deg. F to 170 deg. F). The steering gear shall be bolted to the frame at the cross-member for steering linkage rigidity. Four (4) turns from lock to lock with an 18" diameter slip resistant rubber covered steering wheel. Steering column shall have six-position tilt and 2" telescopic adjustment. The cramp angle shall be a minimum of 45 degrees with 315mm tires or 43 degrees with 425mm tires providing very tight turning ability. **NO EXCEPTIONS**

DRIVE LINE

The driveline shall consist of Spicer 1810 series dual grease fitting universal joints with "half-round" end yokes. The drive shaft shall be built with a heavy-duty steel tube 4.095" outside diameter x .180 wall thickness. The shafts shall be dynamically balanced prior to installation into the chassis. A splined slip joint shall be provided in each shaft assembly. Universal joints shall be extended life. There shall be two (2) Zerk fittings in each universal joint assembly so the joint can be greased without turning the shaft.

ENGINE

The apparatus shall be powered by a Cummins Diesel X 12 500 HP @ 1800 R.P.M., 1695 ft. lb. torque @ 1000 R.P.M.

Displacement: 11.8 liter displacement. Cylinders: 6

Bore: 5.2" (132mm)

Stroke: 5.67" (144mm)

NO EXCEPTIONS TO ENGINE SIZE OR MFR

AIR COMPRESSOR

The air compressor shall be an 18.7 CFM engine driven Wabco.

STARTER

A 12-volt starter shall be provided, controlled by a switch on the left lower cab dash.

EXHAUST SYSTEM

The engine exhaust system shall include the following components: Diesel Particulate Filter (DPF) Diesel Oxidation Catalyst (DOC) Diesel Exhaust Fluid (DEF) Selective Catalytic Reduction Filter (SCR)

The SCR catalyst utilizes the DEF fluid, which consists of urea and purified water, to convert NO_x into nitrogen and water. This shall meet or exceed 2017 EPA emissions requirements.

The engine exhaust system shall be horizontal design constructed from heavy-duty truck components. The exhaust tubing shall be stainless steel to the DPF through to the SCR, aluminized steel from the SCR to the exhaust tip. A heavy duty stainless steel bellows tube shall be used to isolate the exhaust system from the engine. The system shall be equipped with single canister consisting of a Diesel Oxidation Catalyst (DOC) and a Diesel Particulate Filter (DPF), and shall be mounted under the right side frame rail, meeting the specific engine manufacturer's specifications and current emission level requirements. The outlet shall be directed to the forward side of the rear wheels, exiting the right side with a heavy duty heat diffuser. The heat diffuser shall prevent the exhaust temperature from exceeding 851 deg. F during a regeneration cycle. A heat- absorbing sleeve shall be provided on the exhaust pipe in the engine compartment area to reduce the heat, protect the alternator, and also to protect personnel while servicing the engine compartment.

AFTER TREATMENT SYSTEM

To meet EPA requirements of Particulate output, a DPF (Diesel Particulate Filter) is used. To meet EPA requirements of Nitrous Oxide output an SCR (Selective Catalytic Reduction) system utilizing DEF (Diesel Exhaust Fluid) is used.

ON-BOARD DIAGNOSTIC (OBD) SYSTEM

The engine shall be equipped with an on-board diagnostic (OBD) system which shall monitor emissions-related engine systems and components and alert the operator of any malfunctions. The OBD system is designed to further enhance the engine and operating system by providing early detection of emission- related faults. The engine control unit (ECU) will manage smart sensors located throughout the engine and after-treatment system. The system shall monitor component verification and sensor operation. There shall be

warning lights located in the dash instrument panel to alert the operator of a malfunction. A data port shall be provided under the driver's side dash for the purpose of code reading and troubleshooting. All communication shall be provided through the J1939 data link. **NO EXCEPTIONS**

ENGINE WARRANTY

The engine shall have a ten (10) year or 200,000 mile warranty and approval by Cummins Diesel for Registered Major Components Coverage (FCM), which covers major castings and forgings. There shall be no deductible for the first two years. A one hundred dollar deductible shall apply for service beginning the third year. **NO EXCEPTIONS**

AIR CLEANER/INTAKE

The engine air intake and filter shall be designed in accordance with the engine manufacturer's recommendations. It shall be 99.9% effective in removing airborne contaminants when tested per the industry standard SAE J726 procedure and offer a dirt holding capacity of at least 3.0 gm/cfm of fine dust (tested per SAE J726) offering superior engine protection.

The air filter shall be located at the front of the apparatus and shall be at least 66" above the ground, to allow fording deep water in an emergency situation.

An ember separator shall be provided in the engine air intake meeting, the requirements of NFPA 1901. An Air Restriction warning light shall be provided and located on the cab dash.

PRIMARY FUEL FILTER/WATER SEPARATOR

A Cummins approved Fleetguard Fuel Pro FH230 fuel filter/water separator shall be remote mounted to the chassis frame rail. **NO EXCEPTIONS**

SECONDARY FUEL FILTER

A Cummins approved Fleetguard FF5776 fuel filter will be mounted on the driver's side of the engine. **NO EXCEPTIONS**

TRANSMISSION

The chassis shall be equipped with a Generation 5 Allison EVS4000 six (6) speed automatic transmission. It shall be programmed five (5) speed, sixth gear locked out, for fire apparatus vocation, in concert with the specified engine.

The transmission is communicated on the J-1939 through the communication port. The fifth gear shall be an overdrive ratio, permitting the vehicle to reach its top speed at the engine's governed speed. The dipstick is dipped in a rubber coating for ease in checking oil level when hot.

The chassis to transmission wiring harness shall utilize Metri-Pack 280 connectors with triple lip silicone seals and clip-type positive seal connections to protect electrical connections from contamination without the use of coatings.

Ratings: Max Input (HP) 600 Max Input (Torque) 1850 (lb.ft)
Max Turbine (Torque) 2600 (lb.ft)

Mechanical Ratios: 1st - 3.51:1 2ND - 1.91:1

3rd. - 1.43:1

4th - 1.00:1

5th - 0.74:1

Reverse - -5.00:1 **NO EXCEPTION TO TRANSMISSION SIZE OR MFR**

TRANSMISSION FLUID

The transmission shall come filled with an Allison approved Synthetic Transmission Fluid that meets the Allison TES-295 specification.

ENGINE BRAKE

The engine shall be equipped with a Jacobs compression engine brake. An “On/Off” switch and a control for “Low/High” shall be provided on the instrument panel within easy reach of the driver

The engine brake shall interface with the Wabco ABS brake controller to prevent engine brake operations during adverse braking conditions.

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

The brake lights shall activate when the engine brake is engaged.

TRANSMISSION COOLER

The apparatus transmission shall be equipped with a Liquid-To-Liquid remote mounted cooler with aluminum internal components. The cooler shall be encased in aluminum housing and mounted to the outside of the officer's side frame rail for accessibility and ease of service.

TRANSMISSION SHIFTER

An Allison "Touch Pad" shift selector shall be mounted to the right of the driver on the engine cover accessible to the driver. The shift position indicator shall be indirectly lit for nighttime operation.

COOLING SYSTEM

The cooling system shall be designed to keep the engine properly cooled under all conditions of road and pumping operations. The cooling system shall be designed and tested to meet or exceed the engine and transmission manufacturer's requirements, and EPA regulations.

The complete cooling system shall be mounted in a manner to isolate the system from vibration and stress. The individual cores shall be mounted in a manner to allow expansion and contraction at various rates without inducing stress to the adjoining core(s).

The cooling system shall be comprised of a charge air cooler to radiator serial flow package that provides the maximum cooling capacity for the specified engine as well as serviceability. The main components shall include a surge tank, a charge air cooler, bolted to the top of the radiator to maximize cooling, recirculation shields, a shroud, a fan, and required tubing. All components shall consist of an individually sealed system.

RADIATOR

The radiator shall be a cross-flow design constructed completely of aluminum with welded side tanks. The radiator shall be bolted to the bottom of the charge air cooler to allow a single depth core, thus allowing a more efficient and serviceable cooling system.

The radiator shall be equipped with a drain cock to drain the coolant for serviceability. The drain cock shall be located at the lowest point of the aluminum cooling system to maximize draining of the system.

CHARGE AIR COOLER

The charge air cooler shall be of a cross-flow design and constructed completely of aluminum with extruded tanks. The charge air cooler shall be bolted to the top of the radiator to allow a single depth core.

COOLANT

The cooling system shall be filled with a 50/50 mix. The coolant makeup shall contain ethylene glycol and de-ionized water to prevent the coolant from freezing to a temperature of -34 degrees F.

HOSES & CLAMPS

Silicone hoses shall be provided for all engine coolant lines.

All radiator hose clamps shall be spring loaded stainless steel constant torque hose clamps for all main hose connections to prevent leaks. Recirculation shields shall be installed where required to prevent heated air from reentering the cooling package and affecting performance. Any hoses directly affected by heat from the exhaust system, or any other high heat areas shall be insulated with pyrotherm hose protectors.

FAN

The engine cooling system shall incorporate a heavy-duty composite 11- blade Z-series fan. It shall provide the highest cooling efficiency while producing the lowest amount of noise. This robust yet light-weight fan results in less wear and stress on motors and bearings.

A shroud and recirculation shield system shall be used to ensure air that has passed through the radiator is not drawn through again. The fan tip to radiator core clearance shall be kept at a minimal distance to increase the efficiency of the fan and reduce fan blast noise.

FAN CLUTCH

A fan clutch shall be provided that shall allow the cooling fan to operate only when needed. The fan shall remain continuously activated when the truck is placed in pump gear.

SURGE TANK

The cooling system shall be equipped with an aluminum surge tank mounted to the officer's side of the cooling system core. The surge tank shall house a low coolant probe and sight glass to monitor the coolant level. Low coolant shall be alarmed with the check engine light. The surge tank shall be equipped with a dual seal cap that meets the engine manufacturer's pressure requirements, and system design requirements.

The tank shall allow for expansion and to remove entrained air from the system. There shall also be an extended fill neck to prevent system overflow and encroachment of expansion air space. Baffling shall be installed in the tank to prevent agitated coolant from being drawn into the engine cooling system.

FUEL TANK

The chassis shall be equipped with a 65-gallon rear mounted, behind the rear axle, rectangular fuel tank that shall be constructed of steel. The fuel tank shall be certified to meet FMVSS 393.67 tests. It shall also maintain engine manufacturer's recommended expansion room of 5%.

There shall be two (2) tank baffles.

Dual pick-up and return ports shall be provided for diesel generators if required.

The fuel lines shall be nylon braid reinforced fuel hose with brass fittings. The lines shall be carefully routed along the inside of the frame rails. All fuel lines are covered in high temperature rated split plastic loom. Single suction and return fuel lines shall be provided.

The bottom of the fuel tank shall contain a 1/2" drain plug.

FUEL FILL

The fuel tank shall be equipped with a 2-1/4" filler neck assembly with a 3/4" vent located on the driver's side of the truck. A fuel fill cap attached with a lanyard shall be provided.

FUEL COOLER

Installed on the apparatus fuel system shall be an Air-To-Liquid aluminum fuel cooler. The fuel cooler shall be located in the lowest module of the cooling system.

DIESEL EXHAUST FLUID TANK

The exhaust system shall include a molded cross linked polyethylene tank. The tank shall have a capacity of 5 usable gallons and shall be mounted on the left side of the chassis frame.

The DEF tank fill neck shall accept only a 19mm dispensing nozzle versus the standard 22mm diesel fuel dispensing nozzle to prevent cross contamination. The DEF tank cap shall be blue in color to further prevent cross contamination.

A placard shall accompany fill location noting DEF specifications.

ALTERNATOR

A 320 ampere Prestolite/Leece Neville alternator with serpentine belt shall be provided the alternator shall generate 260 amperes at idle.

A low voltage alarm, audible and visual, shall be provided.

BATTERIES

The battery system shall be a single system consisting of six negative ground, 12 volt Interstate Group 31 MHD batteries, cranking performance of 950 CCA each with total of 3800 amps, 185 minute reserve capacity with 25 ampere draw at 80 degrees Fahrenheit. Each battery shall have 114 plates. Warranty shall be accepted

nationwide.

The batteries shall be installed in two vented 304 stainless steel battery boxes with removable aluminum covers to protect the batteries from road dirt and moisture. The battery covers shall be secured with bolts or hold downs to provide easy access for maintenance and inspection. Stainless steel hardware will be used for installation. The batteries are to be placed on dri-deck and secured with a fiberglass hold down. The batteries shall be wired directly to starter motor and alternator.

The battery cables shall be 3/0 gauge. Battery cable terminals shall be soldering dipped, color-coded and labeled on heat shrink tubing with a color-coded rubber boot protecting the terminals from corrosion.

There shall be a 350-ampere fuse protecting the pump primer and a 250-ampere fuse protecting the electric cab tilt pump and other options as required.

BATTERY JUMPER TERMINAL

There shall be one set (two studs) of battery jumper terminals located by the battery box under the cab. The terminals shall have plastic color-coded covers. Each terminal shall be tagged to indicate positive/negative. **NO EXCEPTIONS**

120V SHORELINE INLET & AUTO EJECT

The apparatus shall be equipped with a 120V shoreline inlet to provide power to the battery charger from an external source. The inlet shall include a Kussmaul 091-55-120 Super 20 Auto Eject featuring a 12 volt solenoid which shall eject the shoreline cord away from vehicle path upon sensing engine start. After ejection, a weatherproof cover shall snap into position over inlet.

A 20 amp connector shall be provided and shipped loose for connecting the external shoreline cord to the inlet.

BATTERY CHARGER

An IOTA DLS-45 45 amp battery charger with IQ-3 controller shall be provided and installed in the cab. The charger shall be wired to the 120V shoreline inlet.

FRONT AXLE

The front axle shall be a Meritor™ MFS-20-133A 3.74” drop beam with a capacity of 23,000 pounds. The axle shall be hub piloted, 10 stud, furnished with oil seals and come complete with assist cylinder, hoses, and mounting brackets.

SUSPENSION (FRONT)

The front suspension shall be a variable rate taper-leaf design, 54" long and 4" wide. Long life, maintenance free, urethane bushed spring shackles shall be utilized. All spring and suspension mounting shall be attached directly to frame with high strength Huck bolts and self-locking round collars. Spring shackles and pins that require grease shall not be acceptable. **NO EXCEPTIONS.**

ENHANCED FRONT SUSPENSION SYSTEM

The front suspension shall have the handling, stability, and ride quality enhanced by the use of a Ride Tech auxiliary spring system and Koni high performance shock absorbers.

This system shall utilize three stage, urethane auxiliary springs, and high performance gas filled shock absorbers to control the deflection of the leaf springs, and dampen vibration normally transmitted to the chassis. This maintenance free system will be custom tuned to the apparatus gross weight rating for maximum performance, while maintaining a soft compliant ride. **NO EXCEPTIONS.**

A (3) three year 36,000 mile warranty will be provided by the manufacturer.

FRONT SUSPENSION LOCKING CYLINDERS

Two (2) hydraulic suspension-locking cylinders shall be provided. The cylinders shall be mounted to the chassis frame rails directly above the front axle. The cylinders shall be manually operated from the outrigger control station.

FRONT SUSPENSION LOCKOUT PLATE

The front suspension shall be provided with a lockout plate that limits the travel of the front suspension when the front suspension jack has been engaged.

STEER ASSIST

The steer assist provides driver assistance when turning the vehicle left or right while traveling.

FRONT TIRES

Front tires shall be Goodyear 425/65R22.5, load range L, G296 highway tread, single tubeless type with a GAWR of 23,000 pounds. The rating shall be achieved with the Fire Service Intermittent Service Rating. Wheels shall be disc type, hub piloted, 22.5 x 12.25 10 stud 11.25 bolt circle.

REAR AXLE

The rear axle shall be a Meritor™ RT-48-160 Tandem drive axle with a capacity of 48,000 lbs. The axles shall be hub piloted, 10 studs, furnished with oil seals.

INTER-AXLE DIFFERENTIAL LOCK

A locking inter-axle differential shall be provided between the two rear axles. An activation switch shall be provided on the driver's dash.

TOP SPEED

The top speed shall be approximately 70 MPH. The Kenosha Fire Department shall sign an exception to NFPA 1901 statement letter.

SUSPENSION (REAR)

48,000 TANDEM AIR RIDE

The rear suspension shall be a Raydan Manufacturing, Air Link™ model 952-40-899 air ride suspension. This suspension shall incorporate a quad air spring system. The air suspension bags shall have internal rubber stops giving the ability to operate without air if the need arises. Heavy-duty shock absorbers shall be provided, inboard mounted, to dampen load forces, reduce tire hops, and improve stopping. Torque rods shall be incorporated to restrict lateral movement of the differentials and to reduce bushing and tire wear. Dual height control valves shall be provided to maintain even, balanced loads. Suspension shall have a ground rating of 48,000 pounds.

REAR TIRES

Rear tires shall be Goodyear 12R22.5, load range H, G622 Mud and Snow tread, dual tubeless type with a GAWR up to 48,000 pounds. Wheels shall be disc type, hub piloted, 22.5 x 8.25 10 stud with matching bolt circle.

TIRE PRESSURE MONITOR

A Real Wheels LED tire pressure sensor shall be provided for each wheel. The pressure sensor shall indicate if a particular tire is not properly inflated. A total of ten (10) indicators shall be provided.

WHEELS

The front and rear wheels shall be ALCOA® brand aluminum.

HUB COVERS

Polished stainless steel hub covers shall be provided for the front and rear axles.

LUG NUT CAPS

Chrome plated lug nut caps shall be provided for the front and rear wheels.

MUD FLAPS

Hard rubber mud flaps shall be provided for front and rear tires.

BRAKES, FRONT

The front brakes shall be Arvin Meritor DiscPlus EX225 Air Disc Brakes. Each disc brake assembly shall include one (1) 17" vented rotor, one (1) lightweight hub, one (1) twin-piston caliper, and two (2) quick-change pads.

BRAKES, REAR

The rear brakes shall be Meritor S-cam style. They shall be 16.5" x 8.625" "mountain brakes" with heavy duty return springs, and a double anchor pin design. They shall also have quick change shoes for fast easy brake relining.

AIR BRAKE SYSTEM

The vehicle shall be equipped with air-operated brakes. The system shall meet or exceed the design and performance requirements of current FMVSS-121 and test requirements of current NFPA 1901 standards.

Each wheel shall have a separate brake chamber. A dual treadle valve shall split the braking power between the front and rear systems.

All main brake lines shall be color-coded nylon type protected in high temperature rated split plastic loom. The

brake hoses from frame to axle shall have spring guards on both ends to prevent wear and crimping as they move with the suspension. All fittings for brake system plumbing shall be brass.

A Meritor Wabco System Saver 1200 air dryer shall be provided.

The air system shall be provided with a rapid build-up feature, designed to meet current NFPA 1901 requirements. The system shall be designed so the vehicle can be moved within 60 seconds of startup. The quick build up system shall provide sufficient air pressure so that the apparatus has no brake drag and is able to stop under the intended operating conditions following the 60-second buildup time. The vehicle shall not be required to have a separate on-board electrical air compressor or shoreline hookup to meet this requirement.

Six (6) supply tanks shall be provided. One air reservoir shall serve as a wet tank and a minimum of one tank shall be supplied for each the front and rear axles. A Schrader fill valve shall be mounted in the front of the driver's step well.

A spring actuated air release emergency/parking brake shall be provided on the rear axles. One (1) parking brake control shall be provided and located on the engine hood next to the transmission shifter within easy reach of the driver. The parking brake shall automatically apply at 35 ± 10 PSI reservoir pressure. A Meritor WABCO IR-2 Inversion Relay Valve, supplied by both the Primary and Secondary air systems, shall be used to activate the parking brake and to provide parking brake modulation in the event of a primary air system failure.

Accessories plumbed from the air system shall go through a pressure protection valve and to a manifold so that if accessories fail they shall not interfere with the air brake system.

AIR BRAKING ABS SYSTEM

A Wabco ABS system shall be provided to improve vehicle stability and control by reducing wheel lock-up during braking. This braking system shall be fitted to axles and all electrical connections shall be environmentally sealed from water, weather, and be vibration resistant.

The system shall constantly monitor wheel behavior during braking. Sensors on each wheel transmit wheel speed data to an electronic processor, which shall sense approaching wheel lock and instantly modulate brake pressure up to 5 times per second to prevent wheel lock-up. Each wheel shall be individually controlled. To improve field performance, the system shall be equipped with a dual circuit design. The system circuits shall be configured in a diagonal pattern. Should a malfunction occur, that circuit shall revert to normal braking action. A warning light at the driver's instrument panel shall indicate malfunction to the operator.

The system shall consist of a sensor clip, sensor, and electronic control unit and solenoid control valve. The sensor clip shall hold the sensor in close proximity to the tooth wheel. An inductive sensor consisting of a permanent magnet with a round pole pin and coil shall produce an alternating current with a frequency proportional to wheel speed. The unit shall be sealed, corrosion-resistant and protected from electro-magnetic interference. The electronic control unit shall monitor the speed of each wheel sensor and a microcomputer shall evaluate wheel slip in milliseconds.

COMPRESSION FITTINGS ON AIR SYSTEM

All airline fittings installed on the chassis shall be compression style fittings. The following locations shall utilize push-on fittings:

- Pressure protection valve (accessory block)
- Double check valve (braking system, park brake)
- One way check valve (brake valve tank)
- Elbow Male Modified 1/4" tube x 1/4" MP (low air switch)
- Elbow Male 1/4" tube x 3/8"MP (brake pedal solenoid)
- Connector 1/4" x 3/8"MPT (brake pedal solenoid)
- Switch stoplight (Wabco sealed switch/brake light and service brake switch)
- Low pressure switch (PTC) (Wabco sealed switch/low air switch)

NO EXCEPTIONS

MISCELLANEOUS CHASSIS EQUIPMENT

Fluid capacity plate affixed below driver's seat.

Chassis filter part number plate affixed below driver's seat. Maximum rated tire speed plaque near driver.

Tire pressure label near each wheel location.

Cab occupancy capacity label affixed next to transmission shifter. Do not wear helmet while riding plaque for each seating position. NFPA compliant seat belt and standing warning plates provided. **NO EXCEPTIONS**

ALUMINUM CAB

The cab shall be a full tilt 8-person 10" rear raised roof cab designed specifically for the fire service and manufactured by the chassis builder. Rear of the cab shall be slanted forward at the top rear for mid-ship aerial use. The outside of the rear cab wall shall be aluminum diamond plate.

Apparatus cabs that are not manufactured by the apparatus manufacturer shall not be acceptable.

CAB DESIGN

The apparatus chassis shall be of an engine forward, fully enclosed tilt cab design. There shall be four (4) side entry doors.

The cab shall be of a fully open design with no divider wall or window separating the front and rear cab sections. The cab shall be designed in a manner that allows for the optimum forward facing vision for crew. Cab designs that utilize roof mounted air conditioning units, are not desired.

The cab shall be constructed of high strength 5052H32 aluminum plate welded to 6061-T6 extruded aluminum framing.

The cab roof shall utilize 5" x 5" honeycomb re-enforced 6061 T6 aluminum extrusion, with fully radiused outer corner rails with integral drip channel and 6061 T6 ¾" x 2" x 3/16" aluminum box tubing type cross brace supports. Structures that do not include an integral drip channel will not be accepted. The box tubing type cross brace supports shall be installed in a curved fashion beginning from the midline of the apparatus cab and curving toward the exterior corner rails. This curvature will allow for increased strength in the event of a roll over while not allowing for rainwater buildup on the apparatus cab roof.

The cab sides shall be constructed from 1 ½" x 3" x 3/16" 6061 T6 extruded door pillars and posts that provide a finished door opening, extruded and formed wheel well openings supports, formed aluminum wheel well liners and box tubing type support braces.

The cab floor and rear cab wall shall utilize 1 ¾" x 4" x 3/16" 6061 T6 extruded box tubing type framing and support bracing.

The framework shall be of a welded construction that fully unitizes the structural frame of the cab.

The structural extrusion framework shall be overlaid with interlocked aluminum alloy sheet metal panels to form the exterior skin of the cab. The cab sides shall be constructed of 3/16" thick 5052H32 aluminum plate that slides into an integral channel of the extrusion framework. The plate is then skip welded into that channel to allow for tolerable flex while the apparatus travels down the roadway. Cab designs that utilize 1/8" thick aluminum for the cab sides shall not be acceptable.

NO EXCEPTIONS

The structural extrusion framework shall support and distribute the forces and stresses imposed by the chassis and cab loads and shall not rely on the sheet metal skin for any structural integrity.

The cab face extrusion framework shall be overlaid with 1/8" thick 5052H32 aluminum plate to allow for an aesthetically pleasing radiused cab face.

CAB SUB-FRAME

The cab shall be mounted to a 4" x 4" x 3/8" steel box tube sub-frame, and shall be isolated from the chassis, through the use of no less than six (6) elastomeric bushings. This substructure shall be completely independent of the apparatus cab. The sub frame shall be painted to match the primary chassis color.

The sub-frame shall be mounted to the chassis through the use of lubricated Kaiser Bushings for the front pivot point, and two (2) hydraulically activated cab latches, to secure the rear.

Cab mounting that does not include a sub-frame shall not be considered. **NO EXCEPTIONS.**

CAB DIMENSIONS

The cab shall be designed to satisfy the following minimum width and length dimensions:

Cab Width (excluding mirrors) 98"

Cab Length (from C/L of front axle)

To front of cab (excluding bumper) 68" To rear of cab 73"

Total Cab Length (excluding bumper) 141"

ROOF DESIGN

The cab shall be of a one-half 10" raised roof design with side drip rails and shall satisfy the following minimum height dimensions:

Cab Dimensions Interior Front 59"

Rear 65"

Cab Dimensions Exterior Front 65"

FRONT ENDER CROWNS

Black rubber front axle fenderettes with full depth radiused wheel well liners shall be provided. Please reference current KFD fleet

CAB INSULATION

The exterior walls, doors, and ceiling of the cab shall be insulated from the heat and cold, and to further reduce noise levels inside the cab. The cab interior sound levels shall not exceed 90 decibels at 45 mph in all cab seat positions. NO EXCEPTIONS

EXTERIOR GLASS

The cab windshield shall be of a two piece curved design utilizing tinted, laminated, automotive approved safety glass. The window shall be held in place by an extruded rubber molding. The cab shall be finished painted prior to the window installation.

SUN VISORS

The sun visors shall be made of dark smoke colored transparent polycarbonate. There shall be a visor located at both the driver and officer positions, recessed in a molded form for a flush finish.

CAB STRUCTURAL INTEGRITY

The cab of the apparatus shall be designed and so attached to the vehicle as to eliminate, to the greatest possible extent, the risk of injury to the occupants in the event of an accident.

The apparatus cab shall be tested to specific load and impact tests with regard to the protection of occupants of a commercial vehicle.

A test shall be conducted to evaluate the frontal impact strength of the apparatus cab to conform to the test J2420 and the "United Nations Regulation 29, Annex 3, paragraph 4, (Test A). A second test shall be conducted to evaluate the roof strength of the apparatus cab to conform to the Society of Automotive Engineers (SAE) SAE J2422/SAE J2420 and "United Nations Regulation 29, Annex 3, paragraph 5, (Test B) and SAE J2420. The evaluation shall consist of the requirements imposed by ECE Regulation 29, Paragraph 5.

The test shall be conducted by a certified independent third party testing institution.

A letter stating successful completion of the above test on the brand of cab being supplied shall be included in the bid. There shall be "no exception" to this requirement.

SEAT BELT TESTING

The seat belt anchorage system shall be tested to meet FMVSS 207 Section 4.2a and FMVSS 210 section 4.2. Testing shall be conducted by an independent third party product evaluation company.

A copy of the certification letter shall be supplied with the bid documents.

CAB LOCKDOWN LATCHES

Cab lockdown latches shall be provided to prevent the cab from being tilted in the down position. Once the cab tilt switch is engaged the cab latches will release to allow the cab to be tilted.

CAB TILT SYSTEM

An electrically powered hydraulic cab tilt system shall be provided, and shall lift the cab to an angle of 45 degrees, exposing the engine and accessories for fluid checks and service work. The system shall be interlocked to only operate when the parking brake is set.

The lift system shall be comprised of two (2) hydraulic lift cylinders, an electrically driven hydraulic pump, and a control switch. The hydraulic pump shall be located on the exterior of the frame rail on the driver's side of the chassis that can be easily accessible when the cab is tilted. A mechanical locking system consisting of an air operated actuator and a heavy radiused wall 3" x 3" aluminum extrusion will be provided to ensure the cab remains in the raised position in the event of a hydraulic failure. Additionally, each of the hydraulic

lift cylinders shall incorporate a check valve, and velocity fuses that will activate should a sudden drop in pressure be detected. The cab tilt controls shall be interlocked to the parking brake to ensure the cab will not move, unless the parking brake is set. The cab tilt controls will consist of a momentary raise/lower switch and a two position cab safety lock switch.

The hydraulic lift cylinders will be connected to a steel cab sub-frame, and not directly to the cab. **NO EXCEPTIONS**

MANUAL CAB LIFT

There shall be a manually operated hydraulic pump for tilting the cab in case the main pump should fail. Access to the pump shall be located under the left corner of the front bumper. **NO EXCEPTION**

CAB DOORS

The cab doorframes shall be constructed from 6061 T6 aluminum extrusions fitted with a 5052 H32 aluminum sheet metal skin and shall be equipped with dual weather seals. The outside cab door window opening shall be framed by a black anodized aluminum trim, to provide a clean appearance. The cab doors shall be equipped with heavy-duty door latching hardware, which complies with FMVSS 206. The door latch mechanism shall utilize control cable linkage for positive operation. A rubber coated nylon web doorstop shall be provided.

The doors shall be lap type with a 10 gauge full-length stainless steel flange and 3/8" diameter hinge pin and shall be fully adjustable.

All openings in the cab shall be grommeted or equipped with rubber boots to seal the cab from extraneous noise and moisture.

The cab doors shall be designed to satisfy the following minimum opening and step area dimensions: Door Opening:

Front	36.5" x 73"
Rear	36.5" x 73"

AUXILIARY CAB STEPS

There shall be one additional step under each cab door to assist with entrance and exit of the cab. The steps shall be constructed of aluminum with a grip strut stepping surface. **NO EXCEPTIONS**

CAB STEPS

The lower cab steps shall be no more than 22" from the ground. Grip strut material shall be installed on the stepping surface.

An intermediate step shall be provided, mid-way between the lower cab step, and the cab floor. The

intermediate step shall be slightly inset to provide for safer ingress and egress. Diamond plate material shall be installed on the stepping surface.

All steps shall be covered with material that meets or exceeds the NFPA requirements for stepping surfaces.

STEP LIGHTS

A white TecNiq E41 LED strip light shall illuminate each interior cab step. These lights shall illuminate whenever the battery switch is on and the cab door is opened.

WINDOWS

All four cab entry doors shall have power roll-down windows, which shall all roll down completely.

REAR CAB WINDOWS

No rear windows will be provided in the back wall of the cab.

WINDOW TINTING

The crew cab windows and doors, with the exception of the driver's and officer's doors, and the windshield, shall be tinted with deep "limo" tint. The tint shall be incorporated into the window glass with eight percent (8%) light transmittance. Film tinting shall not be acceptable.

WINDSHIELD WIPERS

Two (2) black anodized finish two speed synchronized electric windshield wiper system. Dual motors with positive parking. System includes large dual arm wipers with built in washer system. One (1) master control works the wiper, washer and intermittent wipe features. Washer bottle is a remote fill with a 4 quart capacity. Washer fill is located just inside of officer cab door.

MIRRORS

Two (2) Lang Mekra 300 Series smooth chrome plated aero style main and convex mirrors shall be installed on each side of the vehicle. The main mirror shall be 4-way remote adjustable with heat, 7" x 16" 2nd surface chromed flat glass. The convex shall be 6" x 8" 2nd surface chromed 400 mm radius glass. Each mirror housing assembly shall be constructed of lightweight textured chrome ABS with on truck glass and housing back cover replacement. In the event the mirror breaks the glass shall be replaceable in (3) minutes or less.

The glass shall include a safety adhesive backing to keep broken glass in place. The mirror assembly shall be supported by a "C" loop bracket constructed of polished stainless steel tube utilizing two point mounting reducing vibration of mirror glass during normal vehicle operation. The lower section of the holder shall include a spring loaded single detent position 20 degrees forward with easy return to operating position without refocusing.

GRILLE

The front of the cab shall be equipped with a polished stainless steel grille with sufficient area to allow proper airflow into the cooling system and engine compartment. Plastic chrome plated grilles shall not be acceptable.

UPPER GRILLE LOGO

The upper grille shall have a laser cut manufacturer logo in the upper portion of the grille. The cut out shall contain reflective material behind.

LOWER GRILLE

The front of the cab shall be equipped with a polished stainless steel lower grille. The design shall allow proper airflow into the cooling system and engine compartment. Plastic chrome plated lower grille shall not be acceptable.

BUMPER

There shall be a 12" high double rib polished stainless steel wrap-around bumper provided at the front of the apparatus. Laser cut perforated grilles shall be incorporated into the bumper and located at the outboard of the frame rails for the air horns and at the center for the siren speaker. The bumper shall be mounted to a reinforcement plate constructed at a minimum of 1/4" x 10" x 70" carbon steel. A gravel shield shall be provided, constructed of .188" aluminum diamond plate. The bumper extension shall be approximately 30".

BUMPER SIDES

The sides of the bumper shall be finished with diamond plate.

STORAGE WELL COMPARTMENT

There shall be a hose well compartment located in the center of the front bumper. The compartment shall run the full length of the bumper and measure approximately 75" long x 22" wide x 12" deep at the ends and 12" deep in the center. The trough shall be constructed of .125" smooth aluminum plate.

DIAMOND PLATE BUMPER LID

There shall be a 1/8" diamond plate cover with latches provided for the front bumper trough. The cover shall have a 6" rise to accommodate the storage well requirements.

AIR HORNS

Two (2) Grover 2040 Stuttertone rectangular, chrome plated, air horns shall be recess mounted, one each side behind the perforated grille of the bumper.

FOOT SWITCHES

A foot switch for the air horns and Q2B Siren shall be provided on the driver's and officer's side.

FEDERAL Q2B SIREN

There shall be a Federal Q2B-NN siren installed in the center of the cab grille. The siren shall be securely mounted and activated by means of a solenoid and shall include a brake.

CAB EXTERIOR LIGHTING

Exterior lighting and reflectors shall meet or exceed Federal Motor Vehicle Safety Standards and National Fire Protection Association requirements.

HEADLIGHTS

The front low and high beam headlights shall be of the heated LED type, rectangular shaped, quad style installed in custom rectangular shaped stainless steel housings on the front of the cab. Each housing shall accommodate a forward-facing turn signal in the outboard location and a side-facing warning light.

An additional pair of rectangular shaped stainless steel housings shall be installed on the front of the cab

above the headlight housings. Each housing shall accommodate two (2) forward-facing warning lights and a side-facing turn signal.

FRONT TURN SIGNALS

There shall be four (4) Whelen 400 Series Model 40A00AAR LED rectangular amber turn signal lights mounted one (1) each side in the front of the headlight housings and one (1) mounted on the side of each warning light housing.

EXTERIOR CAB HANDRAILS

There shall be two (2) 24" long, handrails provided and installed, at each front cab entrance. The handrails shall be constructed of type 304 stainless steel 1.25 inch diameter tubing with bright finish and knurled gripping surface. Mounting flanges shall be constructed from 7 gauge, .180 thick, stainless sheet. Each grab rail shall have 90 degree returns to flanges. The ends of grab rail shall pass through the flanges and be welded to form one structural unit. The handrails shall be mounted using 1.25" SS Hex bolts, with a barrier rubber gasket at each flange. Sufficient space shall allow for a gloved hand to firmly grip the rail.

HANDRAIL SCUFF PLATES

Two (2) 4" wide mirrored stainless steel scuff plate shall be provided, one behind the driver and officer's exterior grab handles.

INTERIOR CAB HANDRAILS

There shall be two (2) rubber coated grab handles provided and mounted on the interior of the cab, one each side, on the windshield post for ingress assistance. The handrail on the driver's side shall be approximately 11" long and the handrail on the officer's side shall be approximately 18" long.

INTERIOR CAB HANDRAILS

There shall be two (2) rubber coated grab handles provided and mounted one each side on the interior of the rear crew cab area for ingress assistance. The handrails shall be approximately 11" long.

CAB DOOR HANDRAILS

There shall be two (2) rubber coated grab handles provided and mounted, one on the inside of each rear crew door, just below the windowsill. The handrails shall be approximately 11" long.

CAB REAR WALL COVERING

The rear outside wall of the cab shall be covered with 1/8" aluminum diamond plate.

DIAMOND PLATE, CAB ROOF

The rear exterior section roof of the cab shall have a diamond plate overlay. The overlay shall be constructed of .125" aluminum serrated diamond plate and measure 36" x 59".

DRIVER'S SIDE CAB COMPARTMENT

There shall be a cabinet constructed of .125 aluminum plate recessed in the cab behind driver's side rear crew door. The compartment shall be approximately 60" high x 15" wide x 22.25" deep.

The compartment shall have a hinged door that is hinged at the front. The doors shall have an Austin Hardware slam catch single-point "D"-ring door closure and held open with gas struts.

The compartment shall be operated by an individual switch and illuminated with (1) LED light.

OFFICER'S SIDE CAB COMPARTMENT

There shall be a cabinet constructed of .125 aluminum plate recessed in the cab behind officer's side rear crew door. The compartment shall be approximately 60" high x 15" wide x 20.25" deep (12.75" deep if front suction)

The compartment shall have a hinged door that is hinged at the front. The doors shall have an Austin Hardware slam catch single-point "D"-ring door closure and held open with gas struts. Door must open past 90 degrees.

The compartment shall be operated by an individual switch and illuminated with (1) LED light.

CAB INTERIOR

The metal surfaces of the cab interior shall be coated and sealed with MultiSpec black speckle, urethane modified, mar resistant paint. The textured coating shall provide paramount durability and wear resistance

against foreign objects and normal wear and tear. The front and rear headliners, as well as the rear cab wall, shall be finished in Gray-Black Durawear covered padded panels.

INTERIOR DOOR PANELS

The interior of the cab entry doors shall have a 304 brushed stainless steel scuff plate, contoured to the door, from the door window sill down.

REFLECTIVE MATERIAL, 4" STRIPE, INTERIOR CAB DOORS

The apparatus shall have a 4" reflective 3M Scotchlite stripe affixed to the inside of each cab door. The striping shall be plainly visible to oncoming traffic when the doors are in the open position.

CAB FLOOR COVERING

The cab interior floor shall be covered with a 5/16" thick, black rubberized material to provide a rugged but cosmetically pleasing stepping surface throughout the cab. The floor covering shall provide superior durability and resistance against foreign objects as well as normal wear and tear.

ENGINE ENCLOSURE

An integral, formed aluminum and composite engine enclosure shall be provided. The engine enclosure shall be contoured and blended in an aesthetically pleasing manner with the interior dash and flooring of the cab. The enclosure shall be kept as low as possible, to maximize space and increase crew comfort. The enclosure shall be constructed from 5052 H2 aluminum plate and GRP composite materials, providing high strength, low weight, and superior heat and sound deadening qualities.

Additionally, the underside of the engine enclosure shall be coated in with a ceramic spray on insulation and sound control. This coating is an environmentally-friendly coating that is applied seamlessly and rapidly while providing superior thermal insulation and protection against vibration and noise, and will prevent future corrosion from forming by sealing the substrate. **NO EXCEPTIONS**

ENGINE ENCLOSURE COVERING

The top of the engine enclosure shall be covered with Scorpion heavy duty, black polyurethane blended coating. The textured coating shall provide paramount durability and wear resistance against foreign objects and normal wear and tear as well as sound deadening and insulation. The rubberized cab floor covering shall extend up the lower exterior sides of the engine enclosure to aid in sound deadening and heat resistance.

TOOL MOUNTING PLATE

There shall be a 3/16" smooth aluminum plate installed on the engine enclosure between the driver and the officer for use in mounting of equipment. The mounting plate shall feature beveled edges on the front and sides for a finished appearance. The plate shall be coated with the same finish as the engine enclosure and shall be secured to the engine cover with screws for easy replacement.

ENGINE HOOD LIGHT

A work light shall be installed in the engine enclosure with an individual switch located on the base of the light.

COMPUTER MOUNT

There shall be a flat work surface in front of the officer's seat for a laptop computer or other use.

CHASSIS WIRING

All chassis wiring shall have XL high temperature crosslink insulation. All wiring shall be color-coded, and the function and number stamped at 4" intervals on each wire. All wiring shall be covered with high temperature rated split loom for easy access to wires when trouble shooting. All electrical connectors and main connectors throughout the chassis shall be treated to prevent corrosion. **NO EXCEPTIONS**

MASTER ELECTRICAL PANEL

The main chassis breaker panel shall be wired through the master disconnect solenoid and controlled by the three-position ignition rocker switch. The breaker panel shall be located in front of the officer on the interior firewall and shall be protected by a removable aluminum cover. The cover shall have an aluminum notebook holder on the exterior face accessible to the officer. The cover shall be painted with a durable finish to match the interior of the cab and shall be secured with two (2) thumb screws.

The breaker panel shall include up to 22 ground switched relays with circuit breaker protection. An integrated electrical sub-panel shall be provided and interfaced to the body and chassis through an engineered wire harness system.

Twelve (12) 20-ampere relays and one (1) 70-ampere relay shall be provided for cab light bar and other electrical items. If the option for a mechanical siren has been selected two (2) additional relays shall be provided.

Up to two (2) additional relay boards with circuit breaker protection shall be provided for additional loads as required. Each board shall contain four (4) relays. The relay boards shall be configured to trip with input from

switch of positive-negative or load manager by moving the connector on the board (no tools required). All relay boards shall be equipped with a power-on indicator light (red), input indicator light (green) and power output indicator light (red).

Up to twenty-three (23) additional automatic reset circuit breakers for non-switched loads that are remotely switched (i.e.: heater fans, hood lights, etc.) shall be provided.

All relays and circuit breakers on the relay boards shall be pull-out/push-in replaceable.

All circuit breakers on the relay boards shall be 20 ampere automatic reset which can be doubled or tripled for 40 or 60-ampere capacity.

The system shall utilize Deutch DRC weather resistant connectors at the breaker panel, toe board and main dash connections.

All internal wire end terminals, including locking connectors, shall be mechanically affixed to the wire ends by matching terminal crimping presses to assure the highest quality terminations.

All internal splices shall be ultrasonically welded connections and all internal wiring shall be high temperature GXL type wire that is protected by wiring duct wherever possible.

All switches shall be ground controlled; no power going through any rocker switch.

Any switch controlling a relay in the breaker panel shall be capable of being set to function only when the parking brake is set. All relays shall be tagged with the function that the relay is controlling.

INSTRUMENT PANEL

The main dash shroud, which covers the area directly in front of the driver from the doorpost to the engine hood, shall be constructed of vacuum formed ABS material with scorpion texture. The dash shall be a one-piece hinged panel that tilts outward for easy access to service the internal components. The gauge panel shall be constructed with a .125" aluminum panel, covered with a scratch resistant reverse printed and laminated poly carbonite.

The gauges shall be AMETEK Vehicular Instrumentation Systems (VIS), Next Generation Instrumentation System (NGI) with built-in self-diagnostics and red warning lights to alert the driver of any problems. All gauges and controls shall be backlit for night vision and identified for function. All main gauges and warning lights shall be visible to the driver through the steering wheel.

MASTER BATTERY & IGNITION SWITCH

The vehicle shall be equipped with a keyless ignition, with a three (3)-position Master Battery rocker switch, "Off/ACC/On" and a two (2)-position Engine Start rocker switch, "Off/Start".

DIESEL PARTICULATE FILTER CONTROLS

There shall be two (2) controls for the diesel particulate filter. One control shall be for regeneration and one control shall be to inhibit engine regeneration. These shall be located below the steering wheel in the kick panel.

INSTRUMENTATION & CONTROLS

Instrumentation on dash panel in front of the driver:

Tachometer/hourmeter with high exhaust system regeneration temperature, and instrument malfunction indicators

Speedometer/odometer with built in turn signal, high beam, and re-settable trip odometer Voltmeter

Diesel fuel gauge

DEF (Diesel Exhaust Fluid) gauge

Engine oil pressure

Transmission temperature Engine temperature Primary air pressure Secondary air pressure

Indicators and warning lights in front of the driver: Parking brake engaged

Low air with buzzer Antilock brake warning Check transmission Transmission temperature Upper power indicator Seat belt

Engine temperature Low oil indicator

Low voltage indicator Air filter restriction light Low coolant indicator High idle indicator Power on indicator

Check engine

Stop engine

Check engine MIL lamp DPF indicator

High exhaust temperature

Wait to start

Other indicator and warning lights (if applicable): Differential locked

PTO (s) engaged Auto-slip response Retarder engaged

Retarder temperature ESC indicator

Jacks Out Jacks Down

Controls located on main dash panel in front of the driver: Master power disconnect with ignition switch

Engine start switch Headlight switch

Windshield wiper/washer switch Differential lock switch (if applicable) Dimmer switch for backlighting

Controls included in steering column: Horn button

Turn signal switch

Hi-beam low-beam switch 4-way flasher switch

Tilt-telescopic steering wheel controls

CENTER CONTROL CONSOLE

There shall be an ergonomically designed center control console. The console shall be constructed of 1/8" smooth aluminum and shall be mounted on the engine hood between the driver and officer. The console shall have a durable coating to match the color of the engine hood covering and shall feature surfaces on each side that are contoured to face the driver and the officer for easy viewing and accessibility. The switches and other customer specified electrical items shall be mounted in removable 1/8" smooth aluminum panels with a black wrinkle finish. The console shall have an aluminum lift-up lid with quick release latch. The lid shall be held in the open position with a gas strut to allow for easy access and serviceability.

Controls located in the console conveniently accessible to the driver: Transmission shifter

Pump shift control with OK TO PUMP and PUMP ENGAGED lights Remote mirror control

Illuminated rocker switches to control high idle, Jacob's brake, siren/horn, siren brake, master emergency, and other customer specified components

12V power point (if applicable)

Controls located in the console conveniently accessible to the driver and the officer (center)

Parking brake control with a guard to prevent accidental engagement

Controls located in the console conveniently accessible to the officer:

Illuminated rocker switches to control customer specified components that are easily reachable to the officer and do not allow for compromise of the driver's view, and eliminate the need for foot switches.

Surface to recess siren head, radio head, or other desired items as space permits 12V power point (if applicable)

Driving compartment warning labels shall include:

- HEIGHT OF VEHICLE
- OCCUPANTS MUST BE SEATED AND BELTED WHEN APPARATUS IS IN MOTION
- DO NOT USE AUXILIARY BRAKING SYSTEMS ON WET OR SLIPPERY ROADS
- EXIT WARNINGS

Additional labels included:

- COMPUTER CODE SWITCH
- ABS CODE SWITCH
- FLUID DATA TAG
- CHASSIS DATA TAG

OVERHEAD CONTROL CONSOLE

An ergonomically designed overhead console shall be provided above the driver and officer, running the full width of the cab. The overhead console shall be constructed from 1/8" aluminum plate and shall be painted with a durable finish to match the inside of the cab. There shall be seven (7) removable 1/8" smooth aluminum plates with a black wrinkle finish to house switches and other electrical items.

Directly above the driver there shall be two (2) panels with no cutouts, unless otherwise specified by the

customer.

There shall be a panel located to the right of the driver that shall be designated for defroster, heat, and air conditioning controls (if specified).

The center overhead panel shall be designated for up to seven (7) door ajar indicators. Upon releasing the apparatus parking brake, one or more of these lights shall automatically illuminate (flash) when any of the following conditions occur that may cause damage if the apparatus is moved: cab or compartment door is open; ladder or equipment rack is not stowed; stabilizer system deployed; any other device has not been properly stowed.

There shall be a panel to the left of the officer as well as two (2) directly above the officer. These panels shall have no cutouts, unless otherwise specified by the customer.

ENGINE WARNING SYSTEM

An engine warning system shall be provided to monitor engine conditions such as low oil pressure, high engine temperature and low coolant level. Warning indication shall include a STOP ENGINE (red) light with audible buzzer activation and a CHECK ENGINE (amber) light

Note: (Some engine configurations may also include a fluid warning light.)

There shall be a master information light bar with 24 lights located across the center of the dash panel that covers up to 24 functions. These are defined under Indicators and Warning Lights above.

PUMP SHIFT MODULE

A pump shift module with indicating lights shall be located within easy reach of the driver. A gear lockup shall be provided to hold the transmission in direct drive for pump operation.

DOOR AJAR LIGHT

A Whelen ION-T LED light shall be installed in the cab near the driver. The light shall illuminate when the parking brake is released and any cab or body door is open or any other item on the apparatus is not properly stowed that may cause damage.

DOOR AJAR ALARM

A door ajar alarm with silence button shall be provided. The location of the button shall be determined at the preconstruction conference.

MAPBOOK SLOT

A mapbook slot shall be installed on exterior of the breaker panel located on the officer's side of the cab.

PROGRAMMABLE LOAD MANAGER

Load manager shall have the ability to sequence loads on and off. The Super Node II has twenty-four (24) inputs and twenty-four (24) outputs. Eighteen (18) are positive polarity outputs and six (6) are ground polarity outputs. It shall also be able to establish a 8 priority levels to shedding loads when the vehicle is stationary, starting at 12.8 volts lowest priority load to be shed, then respectively at 12.7, 12.5, 12.3, 12.1, 11.9, 11.5 and never shed volts DC. An output is shed (turned OFF) when the system voltage drops below the designated priority level's shed voltage for thirty (30) seconds. If the voltage has dropped below multiple priority level shed voltages then each higher priority level will shed before the lower priority levels. An output is unshed (turned back ON) when the system voltage rises above the designated priority level's unshed voltage for ten (10) seconds. If the voltage has risen above multiple priority level unshed voltages then each lower priority level will unshed before the upper priority levels.

MASTER SWITCH

All outputs can be tied or not tied to the stage switch. In fire apparatus this switch is typically referred to as the master switch. The state of the stage switch is controlled by Utility Module output memory space 3.

When this output is active the stage switch is active. Any output tied to the stage switch will be OFF if the stage switch is not active regardless of the output's multiplex equation. Set an output's to be tied to the stage switch by checking the stage switch box in its "Output Port Load Settings" under the "Settings" tab. The name of the stage switch can be changed from the standard "stage" to anything desired by modifying the text in the "Output Port Load Settings" area.

AUTOMATIC HIGH IDLE ACTIVATION

The Utility Module's high idle request (input memory space 2) is activated when the system voltage drops below the high idle threshold (12.8 volts standard or 25.6 volts if 24 volt load management is enabled) for 8 seconds or longer AND load management has been enabled (Utility Module output memory space 1 is active). The high idle request will remain active as long as the voltage remains below the voltage threshold and for 3 minutes after the system voltage rises above the voltage threshold. High idle can be canceled by activating the Utility Module's high idle cancel (output memory space 0).

HIGH IDLE

The engine shall have a "high idle" switch on the dash that shall maintain an engine RPM of 1,000. The switch shall be installed at the cab instrument panel for activation/deactivation. The "high idle" mode shall become operational only when the parking brake is on and the truck transmission is in neutral.

AUXILIARY POWER POINTS

Two (2) 12-volt 20-ampere auxiliary lighter socket type plug-ins, shall be provided in the cab, one near the driver and one near the officer.

USB POWER POINT

One (1) 12-volt dual port USB power point shall be provided in the cab.

CAB ACCESSORY FUSE PANEL

A fuse panel shall be located underneath the rear facing seat on the officer's side. The fuse panel shall consist of six (6) battery hot and six (6) ignition switch circuits. Each circuit shall be capable of 10-ampere 12-volt power and total output of 50-amps. The fuse panel shall be capable of powering accessories such as hand held spotlights, radio chargers, hand lantern chargers and other miscellaneous 12-volt electrical components.

POWER & GROUND STUDS, OVERHEAD COMMAND CONSOLE

There shall be a set three (3) threaded power studs provided in the cab's overhead Command Console for future installation of two-way radios.

The studs shall be wired as follows:

- One (1) 12-volt 60-amp, direct to the battery
- One (1) 12-volt 30-amp controlled by the ignition switch
- One (1) 12-volt 125-amp ground

VEHICLE DATA RECORDER

An Akron / Weldon vehicle data recorder as required by the 2009 edition of NFPA 1901 shall be installed. Vehicle data shall be sampled at the rate of 1 second per 48 hours, and 1 minute per 100 engine hours.

Free software is available to allow the fire department to collect the data as needed.

LIGHTING CAB INTERIOR

Interior lighting shall be provided inside the front of the cab for passenger safety. Two (2) ceiling mounted combination red/clear LED dome lights with a push button on/off switch in the light lens. One light shall be located over each the officer and driver's position. The lights shall also activate from the open door switch located in each cab doorjamb.

LIGHTING CREW CAB INTERIOR

Interior lighting shall be provided inside the crew cab for passenger safety. Two (2) ceiling mounted combination red/clear LED dome lights with a push button on/off switch in the light lens shall be provided. The lights shall also activate from the open door switch located in each cab doorjamb.

HEATER/DEFROSTER/AIR CONDITIONER

There shall be a minimum 65,000 cool BTU and 65,000 heat BTU single unit, heater/air conditioner mounted over the engine cover. The unit shall be mounted in center of the cab on the engine hood/enclosure. Unit shall have a shutoff valve at the right side of the frame, next to the engine. Airflow of the heater/air conditioner shall be a minimum 1200 CFM. To achieve maximum cooling, a TM-21 Compressor (10 cu. in.) will be used.

The defroster/heater shall be a minimum of 35,000 BTU and shall be a separate unit mounted over the windshield. There shall be eight (8) louvers/diffusers to direct to windshield and door glass. Airflow of the defroster/heater shall be a minimum 350 CFM. The unit shall be painted Zolatone Greystone to match the cab ceiling.

The condenser shall be roof mounted and have 65,000 BTU rating. The unit shall include three fan motors. Airflow of the condenser shall be a minimum 2250 CFM. (This roof-mounted condenser shall work at full rated capacity at an idle with no engine heat problems.)

HEATER/DEFROSTER/AIR CONDITIONING CONTROLS

The heater/defroster/air conditioning shall be located in the overhead console in the center of the apparatus cab within reach of the driver and officer. The controls shall be illuminated for easy locating in dark conditions. The controls shall be located in such a way that the driver will not be forced to turn away from the road to make climate control adjustments. Control of all heater/defroster/air conditioning functions for the entire apparatus cab shall be achieved through these controls.

FLOORBOARD HEATING DUCT

There shall be ductwork to the floor of the cab, facing forward to provide heat for the front of cab floor area.

DEFROSTER DIFFUSER

A molded diffuser made of durable ABS plastic ductwork system shall be provided. It shall be form fitted and shall attach to the cab's overhead defroster unit to provide temperature controlled air to the windshields. Air flow of up to 280 cfm is balanced and directed across the entire windshield for optimum defrosting capability in all types of weather.

TOOL MOUNTING PLATE

There shall be a 3/16" smooth aluminum plate installed on top of the heat/ air conditioning unit for use in mounting of equipment. The plate shall measure approximately 25" wide x 19.5" long and shall be spaced up 1". The mounting plate shall feature beveled edges on the front and rear for a finished appearance. The plate shall be coated with the same finish as the heat/air conditioning unit and shall be secured with screws for easy replacement.

DRIVER'S SEAT

A H.O. Bostrom Sierra high back ABTS seat with air suspension shall be provided for the driver. The seat shall be equipped with a red 3-point shoulder harness with lap belt. The seat shall have fore/aft adjustment and shall be upholstered with heavy duty Low Seam Durawear Plus material.

HELMET STORAGE

The helmet for the above seat shall be stored in a compartment. A placard shall be provided visible to the riding position warning that injury may occur if helmets are worn while seated.

OFFICER'S SEAT

An H.O. Bostrom Sierra ABTS high back seat shall be provided for the officer. The seat shall be equipped with a red 3-point shoulder harness with lap belt and an automatic retractor built into the seat assembly. The seat shall have fore/aft adjustment and shall be upholstered with heavy duty Low Seam Durawear Plus material.

UNDER SEAT STORAGE COMPARTMENT

There shall be an open storage area under the officer's seat, accessible from the front. The storage area shall be approximately 19.5" wide x 14.375" high x 21.75" deep. The lower rear portion of the compartment shall be tapered to accommodate the wheel well and wiring chase. The opening shall be approximately 15.5" wide x 10.5" high.

HELMET STORAGE

The helmet for the above seat shall be stored in a compartment. A placard shall be provided visible to the riding position warning that injury may occur if helmets are worn while seated.

EMS CABINET, REAR FACING

There shall be a cabinet constructed of .125 aluminum plate and painted to match the interior of the cab. The cabinet dimensions shall be approximately 21" wide x 22" deep x 39" high. The cabinet shall come complete with a locking roll up door and two adjustable shelves. Strip lighting shall be provided in the cabinet. The location of the cabinet shall be in place of the rear facing crew seat behind the driver.

INTERIOR COMPARTMENT OPENING

The compartment shall come complete with a single interior access opening, and 1" nylon black webbing with black plastic buckles to cover the opening.

ADJUSTABLE SHELF

There shall be an adjustable shelf provided and installed in the compartment. The shelf shall be fabricated of .188 aluminum plate and have two 1.5" x 1.5" x .188" aluminum angles welded to the underside of the shelf for support.

EMS CABINET, REAR FACING

There shall be a cabinet constructed of .125 aluminum plate and painted to match the interior of the cab. The cabinet dimensions shall be approximately 21" wide x 18" deep x 39" high. The cabinet shall come complete with a locking roll up door and two adjustable shelves. Strip lighting shall be provided in the cabinet. The location of the cabinet shall be in place of one of the rear facing crew seats behind the officer.

INTERIOR COMPARTMENT OPENING

The compartment shall come complete with a single interior access opening, and 1" nylon black webbing with black plastic buckles to cover the opening.

ADJUSTABLE SHELF

There shall be an adjustable shelf provided and installed in the compartment. The shelf shall be fabricated of .188 aluminum plate and have two 1.5" x 1.5" x .188" aluminum angles welded to the underside of the shelf for support.

CREW SEAT – DRIVER’S SIDE, FORWARD FACING, INBOARD

One (1) H.O. Bostrom Sierra ABTS high back flip-up base seat shall be installed in the driver’s side forward-facing inboard position. The seat shall be equipped with a red 3-point shoulder harness with lap belt and an automatic retractor built into the seat assembly. The seat shall be upholstered with heavy duty Low Seam Durawear Plus material.

HELMET STORAGE

The helmet for the above seat shall be stored in a compartment. A placard shall be provided visible to the riding position warning that injury may occur if helmets are worn while seated.

CREW SEAT – OFFICER’S SIDE, FORWARD FACING, INBOARD

One (1) H.O. Bostrom Sierra ABTS high back flip-up base seat shall be installed in the officer’s side forward-facing inboard position. The seat shall be equipped with a red 3-point shoulder harness with lap belt and an automatic retractor built into the seat assembly. The seat shall be upholstered with heavy duty Low Seam Durawear Plus material.

HELMET STORAGE

The helmet for the above seat shall be stored in a compartment. A placard shall be provided visible to the riding position warning that injury may occur if helmets are worn while seated.

SEAT UPHOLSTERY COLOR

The cab seat upholstery shall be black in color.

SEAT BELT WARNING SYSTEM

An Akron / Weldon seat belt warning system shall be provided, and shall monitor each seating position. Each seat shall be supplied with a sensor that, in conjunction with the display module located on the dash, shall determine when the seat belt was fastened and if the seat is occupied. An icon shall represent that the seat is properly occupied. An audible and visual alarm shall be activated if the seat is occupied and/or the belt is not fastened in the proper sequence.

CREW SEAT COMPARTMENT

A compartment shall be provided under the forward facing crew seats on the back wall of the cab. Two drop down doors shall be provided on the front face of the compartment. Compartment dimensions are 91.5"L x 14"H x 19"W.

IN-CAB OVERHEAD STORAGE AREA

An overhead storage area shall be provided at the front of the raised roof portion inside of the cab above the rear-facing crew seats. The full-width storage area shall be approximately 84" wide x 10.5" high x 17" deep and shall have a Zolatone gray/black rubberized, textured finish to match the cab interior. Removable nylon netting shall be provided to cover the storage area opening.

ANTENNA MOUNTING

The customer supplied radio antennas shall be installed in the cab roof with the coax cables running to the radio mounting area. The radio location shall be determined at the pre-construction meeting.

ELECTRICAL PROVISION

Wiring shall be provided in the cab for the future installation of electrical chargers. The location shall be determined during the pre-construction conference.

COMMUNICATION SYSTEM

A Firecom 5200D five (5) position wired intercom system shall be provided and installed on the apparatus. The system shall service four (4) cab seat positions and the pump panel. The driver, officer and pump panel shall have radio transmit capabilities. The two crew seats shall have intercom only capabilities.

The system shall include the following components:

- (1) 5200D intercom master station
- (2) UH-51S headsets for driver and pump panel
- (1) UH-51 headsets for officer
- (2) UH-52 headsets for crew
- (4) HM-10 plug modules in the cab
- (1) PP-20 weatherproof plug module at the pump panel
- (1) HE-150 15' coiled extension cable for the pump panel connection
- (2) Mobile radio interface cable as required
- (5) Headset hooks

REAR VISION CAMERA SYSTEM, SINGLE CAMERA

There shall be an Intec single camera color rear vision camera system installed on the apparatus. The system shall include one (1) 6.4" CVD640LCD color display mounted in the cab in plain view of the driver. The display shall incorporate an automatic brightness control. One (1) model CVC500AH color camera shall be installed at the rear of the apparatus to provide clear and unobstructed view behind the rear of the apparatus

while backing. The camera shall deliver a usable color picture at a scene illumination of 0.5 Lux over entire horizontal field of view of at least 123° and a vertical field of view of at least 91°. The camera shall provide an audio function and be equipped with stainless steel mounting bracket and sunshield. The camera shall be equipped with a thermostatically controlled heater and the camera operating temperature range shall be - 40C - +75C. The system shall activate when the transmission is shifted into reverse and stay active until the transmission is shift to another position. A switch on the remote shall activate the system regardless of transmissions shift position. The system shall include one (1) CVS102H Two-Channel Controller (capable of supporting one additional camera) and one (1) CVR100 Remote Control. A CVH series polyurethane cable of appropriate length shall be included between the camera and controller. The system, including the camera, display, controller, remote control and cable, shall be RoHS compliant, FCC, CE, e-mark, and IP68 waterproof certified and carry a five (5) year warranty.

FIRE PUMP HALE OMAX-200

Fire pump shall be midship mounted. The fire pump shall be of the double suction single stage centrifugal type, carefully designed in accordance with good modern practice.

The pump shall be of fine grain alloy cast iron, with a minimum tensile strength of 30,000 PSI.

The pump body shall be horizontally split, on a single plane, casing type with removable lower casing for easy removal of the entire impeller assembly including wear rings and bearings from beneath the pump without disturbing piping or the mounting of the pump in the chassis.

All moving parts in contact with water shall be of high quality bronze or stainless steel. Easily replaceable bronze labyrinth wear rings shall be provided. Discharge passage shall be designed to accomplish uniform pressure readings as the actual pump pressure. The rated capacity of the fire pump shall be 2000 gallons per minute in accordance with NFPA# 1901.

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

PUMP TRANSFER CASE – G SERIES

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

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

The engagement of the pump transmission shall be of such design so as to permit transfer of power from

road to pump operation only after vehicle is completely stopped. The pump shift shall be air actuated from the cab and have both a green "Pump Engaged" light, and a green "O.K.-To-Pump" light. A third green light shall be provided on the pump operator's panel for "Throttle Ready".

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

PUMP SEAL

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 the packing to prevent "cocking" and uneven packing load when it is tightened. It shall be easily adjustable by hand with a rod or screwdriver and requiring no special tools or wrenches. The packing rings shall be of a unique combination of braided graphite filament and braided synthetic packing and have sacrificial zinc foil separators to protect the pump shaft from galvanic corrosion.

PUMP TEST & CERTIFICATION

The pump shall be tested and certified by a third party independent testing agency, in accordance with NFPA 1901. A 3 hour pumping test from draft shall be conducted consisting of 2 hours of continuous pumping at 100% of rated capacity at 150PSI net pump pressure, followed by ½ hour of continuous pumping at 70% of rated capacity at 200PSI net pump pressure, and ½ hour of continuous pumping at 50% of rated capacity at 250PSI net pump pressure). The testing shall also include a pressure control system test, priming system test, vacuum test, a gauge/flowmeter test, and a pumping engine overload test. If the apparatus is equipped with a water tank, the water tank-to-pump test shall also be included.

AUXILIARY COOLER

An auxiliary cooler shall be furnished to provide additional cooling to the engine under extreme pumping conditions. Water from the pump is to be piped to the coils of the heat exchanger allowing the engine fluid to be cooled as required.

PUMP CONNECTIONS

All suction and discharge lines (except pump manifolds) 1" and larger shall be heavy-duty stainless steel pipe. Where vibration or chassis flexing may damage or loosen piping or where a coupling is necessary for servicing, a flexible connection shall be furnished. All lines shall be drained by a master drain valve or a separate drain provided at the connection. All individual drain lines for discharges shall be extended with a 90 degree fitting in order to drain below the chassis frame. All water carrying gauge lines shall utilize nylon tubing.

TANK TO PUMP

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

VALVE

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

VALVE ACTUATOR

The valve shall be controlled by an Innovative Controls push/pull handle located at the operator's panel.

TANK FILL

A 1.5" tank fill shall be provided, using a quarter turn full flow ball valve controlled from the pump operator's panel.

VALVE

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

VALVE ACTUATOR

The valve shall be controlled by an Innovative Controls push/pull handle located at the operator's panel.

PRESSURE GOVERNOR

Apparatus shall be equipped with a Class1 Pressure Governor that is connected to the Electronic Control Module (ECM) mounted on the engine. The Governor will operate as a pressure sensor (regulating) governor (PSG) utilizing the engine's data for optimal resolution and response.

Programmable presets for RPM and Pressure settings shall be easily configurable using the menu structure. Engine RPM, system voltage, engine oil pressure and engine temperature with audible alarm output for all shall be provided.

INTAKE RELIEF

There shall be an Elkhart Model 40 intake relief valve installed on the intake side of the pump. The surplus water shall be discharged away from the pump operator and terminate with Male NST hose thread. System is field adjustable.

6" PUMP INLET

A 6" diameter suction port with 6" NST male threads shall be provided, on the left side of vehicle. The inlet shall extend through the side pump panels and come complete with removable strainer.

PISTON INTAKE VALVE

A piston style Intake Valve shall be provided. The Intake Valve shall be constructed of lightweight, corrosion-resistant, hard-anodized aluminum and stainless steel. The truck side of the valve shall be 6" NST and the inlet shall be either 4" Storz, 5" Storz, or NST. The valve shall also come with a 30 degree swiveling elbow inlet.

INLET ADAPTER

One (1) Task Force Tips #AH3ST-NX 6" NST female x 5" Storz 30-degree adapter with #A01ST 5" Storz cap and chain shall be provided for the above inlet.

2.5" LEFT SIDE INLET

A 2.5" gated inlet valve shall be provided on the left side pump panel. The valve shall be supplied with chrome plate female swivel, plug, chain, and removable strainer. The valve shall attach directly to the suction side of the pump with the valve body behind the pump panel.

VALVE

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

VALVE ACTUATOR

The valve shall be controlled by a swing type handle located at the operator's panel. The handle shall have a full 90 degree movement.

THREAD TERMINATION

The above shall terminate with National Standard Threads.

6" PUMP INLET

A 6" diameter suction port with 6" NST male threads shall be provided, on the right side of vehicle. The inlet shall extend through the side pump panels and come complete with removable strainer and long handle chrome-plated cap.

PISTON INTAKE VALVE

A Piston Style of Intake Valve shall be provided. The Intake Valve shall be constructed of lightweight, corrosion-resistant, hard-anodized aluminum and stainless steel. The truck side of the valve shall be 6" NST and the inlet shall be either 4" Storz, 5" Storz, or NST. The valve shall also come with a 30 degree swiveling elbow inlet.

INLET ADAPTER

One (1) Task Force Tips #AH3ST-NX 6" NST female x 5" Storz 30-degree adapter with #A01ST 5" Storz cap and chain shall be provided for the above inlet.

DISCHARGE #1 - LEFT

The discharge in position #1 on the left side of the apparatus shall include the following features
A 2.5" discharge shall be provided on the left side of the apparatus.

VALVE

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

VALVE ACTUATOR

The valve shall be controlled by a swing type handle located at the operator's panel. The handle shall have a full 90 degree movement.

2.5" PRESSURE GAUGE

An Innovative Controls liquid filled individual line pressure gauge shall be provided. The gauge shall be 2.5" in diameter with white faces and black lettering. The gauge shall have a pressure range of 0-400 psi.

THREAD TERMINATION

The above shall terminate with National Standard Threads.

DISCHARGE #2 - LEFT

The discharge in position #2 on the left side of the apparatus shall include the following features. A 2.5" discharge shall be provided on the left side of the apparatus.

VALVE

The valve shall be an Akron Heavy-Duty swing out 8000 series brass body with flow optimizing stainless steel ball, and dual polymer seats. The valve shall be capable of dual directional flow while incorporating a self-locking ball feature using an automatic friction lock design and specially designed flow optimizing stainless

steel ball. The valve shall not require the lubrication of seats or any other internal waterway parts, and be capable of swinging out of the waterway for maintenance by the removal of six bolts. The valve shall a 10-year warranty covered by Akron Brass.

VALVE ACTUATOR

The valve shall be controlled by a swing type handle located at the operator's panel. The handle shall have a full 90 degree movement.

2.5" PRESSURE GAUGE

An Innovative Controls liquid filled individual line pressure gauge shall be provided. The gauge shall be 2.5" in diameter with white faces and black lettering. The gauge shall have a pressure range of 0-400 psi.

THREAD TERMINATION

The above shall terminate with National Standard Threads.

DISCHARGE #3 - RIGHT

The discharge in position #3 on the right side of the apparatus shall include the following features. A 2.5" discharge shall be provided on the right side of the apparatus.

VALVE

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

VALVE ACTUATOR

The valve shall be controlled by a swing type handle located at the operator's panel. The handle shall have a full 90 degree movement.

2.5" PRESSURE GAUGE

An Innovative Controls liquid filled individual line pressure gauge shall be provided. The gauge shall be 2.5" in diameter with white faces and black lettering. The gauge shall have a pressure range of 0-400 psi.

THREAD TERMINATION

The above shall terminate with National Standard Threads.

DISCHARGE #4 - RIGHT

The discharge in position #4 on the right side of the apparatus shall include the following features. A 4" discharge shall be provided on the right side of the apparatus.

VALVE

The valve shall be an electric brass body with flow optimizing stainless steel ball, and dual polymer seats. The valve shall be capable of dual directional flow while incorporating a self-locking feature using an automatic friction lock design and specially designed flow optimizing stainless steel ball. The valve shall not require the lubrication of seats or any other internal waterway parts, and be capable of swinging out of the waterway for maintenance by the removal of six bolts.

VALVE ACTUATOR

The valve shall be controlled by an Akron model 9323 electric controller located at the operator's panel. Valve position will be displayed on the LCD screen incorporated into the control head.

2.5" PRESSURE GAUGE

An Innovative Controls liquid filled individual line pressure gauge shall be provided. The gauge shall be 2.5" in diameter with white faces and black lettering. The gauge shall have a pressure range of 0-400 psi.

THREAD TERMINATION

The above shall terminate with National Standard Threads.

CROSSLAYS

Two (2) crosslay hose beds shall be supplied. The piping and valves shall be 2", the swivel shall be 1.5". The valves shall be the "drop-out" style, push/pull controlled from the pump panel. Each compartment shall hold 200 ft. of 1.75" double jacket hose. Both beds shall be of the same dimension. There shall be a separate 2.5" crosslay that is pre-piped and mounted on the pump module.

VALVE

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

VALVE ACTUATOR

The valve shall be controlled by an Akron model 9323 electric controller located at the operator's panel. Valve position will be displayed on the LCD screen incorporated into the control head.

2.5" PRESSURE GAUGE

An Innovative Controls liquid filled individual line pressure gauge shall be provided. The gauge shall be 2.5" in diameter with white faces and black lettering. The gauge shall have a pressure range of 0-400 psi.

THREAD TERMINATION

The above shall terminate with National Standard Threads.

CROSSLAY COVER

A vinyl crosslay cover shall be provided to enclose the top and sides of the crosslays, capable of being secured at the top and sides.

MASTER PUMP DRAIN

A multiport master drain valve shall be provided and plumbed to multiple locations on the main pump body. The valve assembly shall be clearly marked as the Master Drain.

DRAIN VALVES LIFT UP STYLE

Vertical lift up style, quarter turn style drain valves shall be provided for each suction inlet, or discharge outlet as specified. Each drain shall be clearly marked and color coded to match the corresponding suction of discharge.

WATERWAY VALVE AND ACTUATOR

The waterway valve shall be an Akron 3" electric valve. The valve shall be controlled by an Akron Navigator 9325 electric actuator located at the operator's panel. The actuator shall be connected to both a flow sensor and a pressure sensor. The actuator shall display pressure, flow, and valve position on a full color LDC display.

WATERWAY DRAIN VALVE

An Akron 1.5" waterway drain valve shall be provided and controlled with a push/pull handle.

FOAM SYSTEM

There shall be an Akron Model 3126 125 G.P.M. By-Pass Eductor installed in one 2.5" discharge for one foam tank. The system shall come complete with a combination instruction plate and a 0-1-2-3-6% metering valve, as well as all necessary valves and check valves to properly flush the system.

FOAM TANK

There shall be a 20-gallon foam tank. The tank shall be part of the main booster tank. There shall be a 3" PVC fill tower and cap and a tank vent. There shall be a 1-1/2" flanged outlet and drain valve at the lowest point in the tank.

PUMP AND GAUGE PANELS

Pump panels on both sides shall be easily removable. The gauge and control panels shall be two separate panels for ease of maintenance. There shall be one (1) removable access door as large as possible on the right side pump panel. This door shall have 1/4 turn latching mechanisms for easy removal.

The pump controls and gauges shall be located at the left side of the apparatus and properly marked. The control panel shall be laid out in a user-friendly manner.

All valve controls shall have the corresponding discharge gauge located immediately adjacent to control handle to allow operator to view the discharge pressure without searching the panel.

PANEL FINISH

The panels shall be constructed of brushed stainless steel for maximum protection against abrasion caused during normal use

ESCUTCHEON PLATES

The pump panel shall be equipped with color-coded removable escutcheon plates around the suction and discharge valves.

COLOR CODING

Each discharge valve control, outlet, and corresponding line gauge shall be color-coded. The color-coding shall be (as applicable):

#1 Discharge - Yellow

#2 Discharge – White

#3 Discharge – Navy Blue

#4 Discharge - Black

#5 Discharge - Green

#1 Pre-Connect - Orange

#2 Pre-Connect - Red

#3 Pre-Connect - Brown

#4 Pre-Connect - Magenta Front Bumper Line - Turquoise

Large Diameter Discharge – Yellow with White Border Left Hose Bed Pre-Connect - Tan

Right Hose Bed Pre-Connect - Lavender Left Rear Discharge - Olive

Right Rear Discharge – Light Blue Deck Gun – Silver

Inlets – Burgundy Tank Fill - Lime Green

Tank to Pump – Burgundy

PUMP MODULE FRAMEWORK

The pump module framework shall not be painted.

PUMP FINISH

The fire pump shall not be painted. The pump shall remain in its natural finish.

PLUMBING FINISH

The plumbing shall not be painted. All fittings, pipe, and valves shall remain in their natural finish.

RUNNING BOARD TROUGHS

Troughs shall be provided in the officer and driver side running board to hold a 15-foot length of 5" hose. Pull out step under the driver side trough.

PUMP PANEL LIGHTS, LED

The driver's side pump panel controls and gauges shall be illuminated by a minimum of three (3) Weldon model 2631 light strips.

PUMP PANEL LIGHTS, LED

The officer's side pump panel shall be illuminated by a minimum of three (3) Weldon model 2631 light strips.

PUMP PANEL ILLUMINATION

One pump panel illumination light shall be activated when the pump is engaged.

PUMP PANEL GAUGES AND CONTROLS

The following gauges and controls shall be provided at the pump panel:

- Two (2) certified laboratory test gauge outlets.
- Pump primer control.

- Master drain control and additional drains as needed.
- Tank-fill and pump cooler valve controls.
- Tank to pump valve control.
- Pump capacity rating plate.
- All discharge controls.
- Two (2) master pump gauges.
- Gauges on all 1-1/2" and larger discharge lines.

PRIMING SYSTEM

The priming pump shall be a Trident Emergency Products compressed air powered, high efficiency, multi-stage, venturi based AirPrime System. All wetted metallic parts of the priming system are to be of brass and stainless steel construction. The priming system shall have a five year warranty.

(1) PRIMER BUTTON - MAIN SUCTION

A single panel mounted control will activate the priming pump and open the priming valve to the pump.

COMPRESSION FITTINGS ON AIR SYSTEM

Compression style fittings shall be provided on air lines within the pump module. **NO EXCEPTIONS**

PUMP OVER HEAT INDICATOR

A MC pump overheat indicator with bell alarm shall be provided. **NO EXCEPTIONS**

FUEL GAUGE

A fuel gauge shall be provided at the pump operator's panel to monitor the apparatus fuel level.

AIR HORN BUTTON

A push button switch shall be provided on pump operator's panel to activate the air horns.

4" MASTER GAUGES

Innovative Controls liquid filled pump pressure and vacuum gauges shall be provided. The gauges shall be 4" in diameter with white faces and black lettering. The gauges shall have a pressure range of 30"-0-400 psi.

WATER TANK GAUGE

An Innovative Controls weather proof encapsulated (14) super bright LED light indicator shall monitor the water tank level and shall be mounted on the pump operator's panel. The fourteen LED lights are arranged in a "V" pattern for easy identification of liquid level. When the liquid level reaches less than a 1/4 full the refill level begins to flash. The tank-sensing probe shall be chemical resistant PVC with stainless steel sensing wires. The cover plate shall be aluminum sub-plate, black background and blue graphics, with an outdoor exposure rated composite overlay.

FOAM TANK GAUGE

A Class1 Intelli-Tank foam level gauge shall be provided. The gauge shall feature wide-angle viewing and four (4) Ultra-bright LED's for high visibility even in direct sunlight. Foam level sensing shall be through a pressure transducer, and capable of indicating nine (9) accurate levels.

WATER TANK

The water tank shall be constructed of polypropylene sheet stock. This material shall be non-corrosive, stress relieved thermoplastic, black in color and U.V. stabilized for maximum protection. The tank shall be of a special configuration and is so designed to be completely independent of the body and compartments.

The tank shall be constructed with transverse and longitudinal swash partitions. 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 and meet NFPA rules. All swash partitions shall interlock with one another and welded to each other as well as to the walls and floor of the tank.

The tank shall have a combination vent and fill tower. The fill tower shall be constructed of 1/2" thick polypropylene and shall be a minimum dimension of 8"x 8" outer perimeter. The tower shall have a 1/4" thick removable screen and a hinged-type cover. Inside the fill tower, there shall be a combination vent overflow pipe. The vent overflow shall be a minimum I.D. of 4" that is designed to run through the tank, and shall be piped behind the rear wheels where specified by the purchaser so as to maximize traction.

There shall be one (1) sump standard per tank. The sump shall be constructed of 1/2" black polypropylene and located in the left front corner of the tank, unless specified otherwise. On all tanks that require a front suction, a schedule 40 polypropylene pipe shall be installed that will incorporate a dip tube from the front of the tank to the sump location. The sump shall have a minimum 3" FNPT threaded outlet on the bottom for a drain plug. This shall be used as a combination cleanout and drain. The tank shall have an anti-swirl plate above the dip tube.

There shall be two (2) standard tank outlets: one for tank to pump suction line and one for a tank fill line. All tank fill couplings shall be backed with flow deflectors to break up the stream of water entering the tank. All auxiliary outlets and inlets must meet N.F.P.A. 1900 guidelines in effect at the time of manufacture.

The tank shall rest on the body cross members to adequately support the water tank per the tank

manufacturer's specifications.

The tank shall be isolated from the cross members through the use of hard rubber strips with a minimum thickness ¼". Additionally, the tank shall be supported around the entire bottom outside perimeter and captured front and rear as well as side to side to prevent tank from shifting during vehicle operation.

The tank shall be completely removable without disturbing or dismantling the apparatus structure.

The tank shall come with a lifetime warranty. The tank manufacturer shall mark the tank and furnish notice that indicates proof of warranty.

WATER TANK

The water tank shall have a capacity of 500 U.S. gallons.

BODY CONSTRUCTION

All side metal, compartments and compartment floors shall be of bolted stainless steel. The body shall be mounted on heavy-duty 3" steel channel sills with bracing for extreme rigidity.

The compartment body, pump housing and the engine compartment shall be separate modules (segmented body design) that are not to be fastened together in any manner in order to provide "flex joints" to alleviate stress and cracking of body compartments and running boards.

Compartments shall extend from the front jacks to the tailgate of the apparatus and shall be recessed to the frame of the apparatus where possible.

Each compartment shall have drain holes for the release of moisture. Each compartment shall be properly vented with louvers. Compartments shall have sweep-out flooring (no obstruction at the floor bottom).

REAR COMPARTMENT BELOW HOSE BED

There shall be a compartment below the hose, between the frame rails, approximately 25-1/2" wide x 14- 1/2" high with a lower section 72" deep and an upper section 88-3/4" deep designed to hold a stokes basket.

COMPARTMENTATION LEFT SIDE

L1- Below the turntable there shall be a compartment approximately 26-5/8" wide x 34-3/8" high x 26-1/2" deep. Compartment height is 12" below the hydraulic controls.

L2, L3- There shall be two compartments above the rear wheels approximately 57-3/4" wide x 19-1/8" high x

26-1/2" deep. The compartments will have lift up pan type doors, equipped with "D" ring latch and a gas door stays.

L4- There shall be a compartment behind the rear wheels approximately 37-3/4" wide x 48-1/2" high x 26- 1/2" deep.

L5- There shall be a second compartment behind rear wheels approximately 42-3/4" wide x 48-1/2" high x 26- 1/2" deep.

L6- There shall be a third compartment behind rear wheels approximately 22-1/2" wide x 42-1/4" high x 26-1/2" deep.

There shall be (2) two additional compartments above L2-L6 approximately 90" wide x 16" high x 25" deep.

COMPARTMENTATION RIGHT SIDE

R1- Below the turntable there shall be a compartment approximately 42" wide x 34-1/4" high x 26-1/2" deep. The lower portion shall be 10" deep. There shall be a 10" high x 17" deep x 42" wide notch in the lower rear portion of the compartment to accommodate the apparatus exhaust system.

R2- There shall be a compartment behind the rear wheels approximately 37-3/4" wide x 28" high x 26-1/2" deep inside.

R3- There shall be a second compartment behind rear wheels approximately 42-3/4" wide x 28" high x 26- 1/2" deep inside.

R4 There shall be a third compartment behind rear wheels approximately 25" wide x 19" high x 26-1/2" deep inside.

AERIAL BODY SUB-FRAME

The chassis shall be fitted with a sub-frame system consisting of a series of mild steel legs, extending down and out from the chassis frame rails on each side. A heavy-duty rear platform shall be constructed of the mild steel to support the rear compartments. Self-supporting bodies will not be acceptable. **NO EXCEPTIONS**

COMPARTMENT INTERIOR - L1

The L1 compartment on the left side of the apparatus shall include the following features: No compartment options were selected for L1

COMPARTMENT INTERIOR - L2

The L2 compartment on the left side of the apparatus shall include the following features: No compartment options were selected for L2

COMPARTMENT INTERIOR - L3

The L3 compartment on the left side of the apparatus shall include the following features: No compartment options were selected for L3

COMPARTMENT INTERIOR - L4

The L4 compartment on the left side of the apparatus shall include the following features: No compartment options were selected for L4

COMPARTMENT INTERIOR - L5

The L5 compartment on the left side of the apparatus shall include the following features: No compartment options were selected for L5

COMPARTMENT INTERIOR - L6

The L6 compartment on the left side of the apparatus shall include the following features: No compartment options were selected for L6

COMPARTMENT INTERIOR - R1

The R1 compartment on the right side of the apparatus shall include the following features: No compartment options were selected for R1

COMPARTMENT INTERIOR - R2

The R2 compartment on the right side of the apparatus shall include the following features: No compartment options were selected for R2

COMPARTMENT INTERIOR - R3

The R3 compartment on the right side of the apparatus shall include the following features: No compartment options were selected for R3

COMPARTMENT INTERIOR - R4

The R4 compartment on the right side of the apparatus shall include the following features: No compartment options were selected for R4

COMPARTMENT INTERIOR - A1

The A1 compartment on the rear of the apparatus shall include the following features: A slide out tray with a weight rating of 500 pounds minimum shall be provided in the A1 compartment. The dimensions shall be, at a minimum, 72" x 40" x 10"

UNISTRUT

Each compartment shall come equipped with 1.625" x .875" x .125" aluminum Unistrut channel. The Unistrut shall be securely fastened to the interior walls of the compartment.

COMPARTMENT DOORS

The compartment doors shall be box pan construction. The doors are stainless steel and approximately 2" thick and include a double weatherproof seal. Each door shall be vented to prevent condensation within the compartment door walls.

The compartment doors shall have flush mounted stainless steel bent "D" ring door handles and two-point positive type latches with adjustable catches (slam type door catches). Gas strut cylinder arms shall be mounted on each swing out compartment door. The door pan on the back shall be closed and the latches shall be so designed that they can be removed through the D-ring opening.

Compartments shall have full-length stainless steel hinges. The compartment to the right of the pump panel shall have a right hinged door, all other compartment doors shall be left hinged.

A door open indicator light shall be provided in the cab.

COMPARTMENT LIGHTING

Each compartment shall be equipped with two (2) white AMDOR LED light strips which shall provide a consistent pattern to illuminate to entire compartment.

HOSE BED

The rear hose bed shall be completely wide open to allow for quick and easy loading and unloading of hose thus preventing hose and hose couplings from being caught or tangled.

Rear opening of the rear hose bed shall be a minimum of 42" wide x 28" high. Any rear hose bed opening(s) requiring hose chutes shall not be acceptable. Must be capable of a minimum of 1,000 feet of 5 inch hose.

NO EXCEPTIONS

Hose bed flooring shall be removable slatted aluminum.

HOSE BED COVER

There shall be a red nylon/vinyl hose bed cover for the main hose bed. The cover shall be capable of being securely fastened at the front, sides and rear.

COVER FASTENERS

The hose bed cover shall be secured with black plastic buckles.

BODY HANDRAILS

Handrails shall be constructed of type 304 stainless steel 1.25 inch diameter tubing with bright finish and knurled gripping surface. Mounting flanges shall be constructed from 7 gauge, .180 thick, stainless sheet. Each grab rail shall have 90 degree returns to flanges. The ends of grab rail shall pass through the flanges and be welded to form one structural unit. The handrails, shall be mounted using 1.25" SS Hex bolts, with a barrier rubber gasket at each flange. Sufficient space shall allow for a gloved hand to firmly grip the rail.

The rails shall be located in the following areas:

(Note: These are in addition to those previously mentioned in the cab section):

There shall be one (1) handrail on each side of the access steps to the ladder. These handrails are covered with ribbed rubber to prevent hand slipping when climbing the steps.

RUB RAILS

The body shall be equipped with heavy black UHMW rub rails at the sides. Rub rails shall be spaced away from the body by 1/2" polymer spacers. **NO EXCEPTIONS**

ALUMINUM TREADPLATE

All load bearing aluminum treadplate running boards shall be .155 thick bright annealed with a serrated embossed finish. Running boards and rear step edges shall be flanged down for added strength. Running boards shall also be flanged up to form kick plates. All non-load bearing aluminum shall be .125" thick bright annealed finish. In areas where aluminum treadplate shall function as a load-bearing surface, there shall be a heavy steel sub-structure. This structure shall consist of 3" channel and 1-1/2" angle welded support. This shall assure that

there shall be no flexing or cracking of running boards. The aluminum shall be insulated from the steel by closed cell foam body barrier material.

Treadplate locations:

1. Skirting around front bumper.
2. The step at the cab entrance.
3. The jump seat steps.
4. The running boards.
5. The rear step.

WHEEL LINERS

Fiberglass fully radiused wheel well liners with adequate support to maintain their rigidity through adverse weather conditions shall be provided.

SCBA CYLINDER COMPARTMENTS

There shall be seven (7) spare breathing air cylinder compartments recessed in the rear fender wells, three (3) left and four (4) right. The compartments shall have brushed stainless doors with equipped with a weather resistant flush fitting thumb latch. The interior of the door shall incorporate a rubber seal to keep the compartment free of road debris and moisture. The interior compartment shall be constructed of a high-density polyethylene plastic.

GROUND LADDERS

Apparatus shall be capable of carrying minimum of 149 feet of ground ladders to meet the requirements of NFPA. The following ladders shall be provided.

DUO-SAFETY LADDERS

One (1) 10 ft. folding ladder, Series 585A (Mounted in fly section) One (2) 16 ft. roof ladders, Series 875A, (1 Mounted on base section, 1 mounted to ladder rack)

One (1) 18 ft. roof ladders, Series 875A, (Mounted on base section)

One (2) 28 ft. 2-section extension ladder, Series 1200A One (1) 35 ft. 3-section extension ladder, Series 1225A

LADDER MOUNTING

The ladders shall be mounted on brackets on the side of the body and held in place by polished aluminum quick-release spring locks. Loading and unloading of ground ladders from rear of apparatus shall not be acceptable.

LICENSE PLATE BRACKET

A Cast Products LP0013 cast aluminum license plate bracket with LED light shall be provided at the rear of the apparatus.

BODY ELECTRIC SYSTEM

All body electrical wiring in the chassis will be XLP cross link-insulated type. Wiring is to be color-coded and include function codes every three (3) inches. Wiring harnesses will be routed in protective, heat resistant loom, securely and neatly installed. Two power distribution centers will be provided in central locations for greater accessibility. The power distribution centers contain automatic thermal self-resetting breakers, power control relays, flashers, diode modules, daytime driving light module, and engine and transmission data links. All breakers and relays are utilized in circuits which amp loads are substantially lower than the respective component rating thus ensuring long component life. Power distribution centers will be composed of a system of interlocking plastic modules for ease in custom construction. The power distribution centers are function oriented. The first is to control major truck function and the second controls overhead switching and interior operations. Each module is single function coded and labeled to aid in troubleshooting. The centers also have accessory breakers and relays for future installations. All harnesses and power distribution centers will be electrically tested prior to installation to ensure the highest system reliability. All external harness interfaces will be of a triple seal type connection to ensure a proper connection. The cab/chassis and the chassis/body connection points will be mounted in accessible locations. Complete chassis wiring schematics will be supplied with the apparatus.

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

All harnesses shall be covered with moisture resistant loom with a minimum rating of 300 Degrees Fahrenheit and a flammability rating of VW-1 as defined in UL62. The covering of jacketed cable has a minimum rating of 289 degree Fahrenheit.

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

All circuits conform to SAE1292. All circuits are provided with low voltage over current protective devices. These devices are readily accessible and protected against heat in excess of component rating, mechanical damage, and water spray. Star washers are not used for ground connections.

BACK-UP ALARM

An Ecco model SA917 automatic self-adjusting electronic back-up alarm producing 87-112 dB shall be installed at the rear between the frame rails. It shall operate whenever the transmission's reverse gear is selected.

STOP/TAIL/TURN/REVERSE LIGHTS

The rear stop/tail/turn/reverse lights shall be Whelen 600 series lights installed in chrome plated PLAST3V triple housings one (1) each side on the rear of the apparatus body. The stop/tail lights shall be LED model 60BTT located in the top position of the housing. The amber arrow turn signals shall be LED model 60A00TAR located below the stop/tail lights. The reverse lights shall be LED model 60C00WCR (maximum intensity) located below the turn signals in the bottom position of the housing.

PARKING LIGHTS

TecNiq LED surface mount lights shall be installed, one each side, in rear fenders, to illuminate the side and rear of the apparatus. The lights shall be wired to come on when the apparatus is placed in reverse.

LED ICC/MARKER LIGHTS

LED type ICC/marker lights shall be provided to meet D.O.T. requirements.

STEP LIGHTS

The pump module running board area shall be illuminated by Whelen 2G 4" diameter LED lights mounted one each side on the front of the body in chrome flanges.

LED strip lighting or individually mounted lights shall be provided at the rear of the body to illuminate all stepping surfaces.

GROUND LIGHTING

The apparatus shall be equipped with lighting capable of illumination to meet NFPA requirements. Lighting shall be provided at areas under the driver and crew riding area exits and shall be automatically activated when the exit doors are opened. The ground lights shall be Truck-lite® LED model #44042C. Lighting required in other areas such as work areas, steps and walkways shall be activated when the parking brake is applied, provided the ICC lights are on.

REAR WORK LIGHTS

Two (2) Rigid Industries D2 Diffusion LED flood lights shall be provided. One (1) shall be mounted on each side on the upper rear of the apparatus body. The lights shall be activated by a switch inside the cab near the driver.

OPTICAL WARNING SYSTEM

The optical warning system shall be capable of two separate signaling modes during emergency operations. One mode shall signal to drivers and pedestrians that the apparatus is responding to an emergency and is calling for the right-of-way and the other mode shall signal that the apparatus is stopped and is blocking the right-of-way.

A momentary rocker switch shall be provided near the driver and labeled Master Emergency to energize all of the optical warning devices provided. A secondary momentary rocker switch shall be provided near the officer. All lights shall operate at not less than the minimum flash rate per minute as specified by NFPA.

UPPER LEVEL WARNING DEVICES

The upper level shall be divided into zones A (front), B (officer's side), C (rear) and D (driver's side). Zone A (front) shall have one (1) Whelen Freedom IV 72" Model F4N7QLED light bar, with twelve (12) LED modules. The light bar shall have two (2) end red LED modules, two (2) corner red LED modules, two (4) forward-facing red LED modules and two (4) forward-facing white LED modules. The light bar shall have all clear outer lenses. The light bar shall be installed on the cab roof as far forward as possible with two (2) MK8H 5" cast aluminum risers.

OPTICOM AND WIFI

One (1) GPS/ Opticom PREEMPTION VEHICLE KIT (HIGH PRIORITY) SERIES 2000: GTT, 76-1000-1155-0 shall be supplied and mounted. One (1) Wi-Fi Firstnet antenna of ap-ibr11-q-wh shall be supplied and mounted by manufacturer.

LOWER LEVEL WARNING DEVICES

The lower level shall be divided into zones A (front), B (officer's side), C (rear) and D (driver's side). Zone A (front) shall have four (4) Whelen 600 series model 60*02F*R Super LED warning lights.

The lights shall be installed two (2) each side on the front of the cab in the warning light housings.

Zone B (officer's side) shall have four (4) Whelen 600 series model 60*02F*R Super LED warning lights.

The lights shall be installed one (1) near the front corner of the apparatus, one (1) under the turntable area, one (1) near the rear axle, and one (1) near the rear corner of the apparatus.

Zone C (rear) shall have two (2) Whelen 600 series model 60*02F*R Super LED warning lights installed one

(1) each side on the lower rear of the apparatus.

Zone D (driver's side) shall have four (4) Whelen 600 series model 60*02F*R Super LED warning lights.

The lights shall be installed one (1) near the front corner of the apparatus, one (1) under the turntable area, one (1) near the rear axle, and one (1) near the rear corner of the apparatus.

INVERTER

The apparatus shall be equipped with a Vanner power inverter. The inverter must be capable of providing a continuous load of 3000 watts with the ability to handle start up of larger components (surge)

CORD REEL

There shall be a Hannay Model ECR1616-17-18/4 electric rewind, four (4)-conductor cable reel furnished and mounted in a compartment. The reel shall come complete with 150 feet of 10/4 Seoprene Water-resistant (SOW) yellow jacketed cable. A Hannay Type "C" roller assembly and HS-3 cable stop ball shall be provided.

AERIAL LADDER DEVICE

An aerial ladder device with a minimum 100-foot vertical reach shall be provided **No Exceptions**.

The height dimension shall be calculated with the boom at 80 degrees. The horizontal reach of the device shall not be less than 93 feet, 6 inches. The overall height of the apparatus with the aerial device in the bedded positions shall be no more than 10 feet, 1 inches and the overall length of vehicle shall be not more than 43 feet, 6 inches.

TELESCOPING AERIAL

An elevated ladder of the telescopic design consisting of a minimum of five sections shall be provided. The overall length of the aerial with all five sections fully retracted at 0 degree elevation shall not exceed 29 feet.

These particular shorter lengths shall be important for allowing the ladder to be positioned in tight or confined spaces associated with lower degrees of elevation. All sections shall be of the open lattice, non-crossing type construction to obtain lightweight and stability at full horizontal reach. The telescoping sections shall be constructed from heat-treated 6061-T6 aluminum alloy material fastened by permanent locking bolts to provide superior strength thus eliminating cracking of welds in strategic structural areas. There shall be no welding on the ladder so as not to lower the yield strength of the material and cause torsional fracture, grain distortions and unequal conductivity. The base section shall also consist of two heavy-duty steel side plates; one mounted each side of the ladder. The steel side plates shall be aircraft Huck bolted into place and shall function to tie the ladder, turntable, and lift cylinders together. There shall be trailing beams

attached to the side plates that shall function to position and anchor lift cylinders into place and to distribute shock loads imposed by water hammer and hose breakage.

The ladder rungs shall be constructed from a solid extrusion and shall have an oval serrated profile. The rungs shall be spaced on 14 in. (356-mm) centers and shall have a minimum outside diameter of 1-1/4 in. (32-mm) including the surface. The minimum design load per rung shall be 500 lb. (227 kg) distributed over a 3 1/2 in. (89-mm) wide area at the center of the length of the rung with the rung oriented in its weakest position.

Top rails shall be provided on the ladder, shall have a minimum width of 1 in. (25 mm), and shall be at a minimum height of 17 in. (305 mm) above the centerline of the rungs.

Two folding steps with skid-resistant surfaces shall be provided on the ladder for the use of the waterway-monitor operator. Each folding step shall have a minimum design load of 500 lb. (227 kg) and shall be a minimum of 35 sq. in. (22582 mm²) in area.

The rated horizontal reach of an aerial ladder shall be measured in a horizontal plane from the center line of the turntable rotation to the center line of the outermost rung on the fly section with the aerial ladder extended to its maximum horizontal reach.

The ladder shall be left in a natural aluminum finish and painting the ladder shall not be acceptable. The ladder shall have the capability to shed massive ice buildup during freezing conditions.

AERIAL EGRESS SECTION

A bolt-on removable egress shall be installed on the tip of the fly section. The rungs on the egress shall be on a plane of 20 degrees to provide a smoother transition onto the ladder when it is at a high angle.

LOAD LIMITATIONS

Load instruction plates shall be located at the turntable pedestal control station, indicating the recommended safe load of the ladder. The ladder shall carry the rated load capacity indicated in the following manner: raise, extend, rotate, retract and lower without exceeding the hydraulic pressures prescribed by the manufacturer.

THE LADDER SHALL HAVE A CAPACITY OF 750 LBS. DRY AND 500 LBS. WHILE FLOWING WATER. THESE LIMITATIONS MUST BE MET IN ALL POSITIONS OF LADDER OPERATION WITH PROPERLY SET OUTRIGGERS. NO EXCEPTIONS.

ADDITIONAL INFORMATION. Ladder shall be capable of being rotated in any direction and the ladder capable of being raised or lowered ---**ALL AT THE SAME TIME. NO EXCEPTIONS**

RAISING AND LOWERING

The raising and lowering mechanism shall consist of two large hydraulic cylinders approximately seven inches in diameter attached to the ladder so that 50% of the lifting force effort is applied towards raising the ladder and it shall raise the complete load, 750 lbs., with ladder at full horizontal reach with less than 1500 psi. hydraulic pressure. Cylinders shall be mounted so that the cylinder rods are attached to trailing beams of the ladder steel side plates.

The power operated raising and lowering cylinders shall provide movement of the ladder to be rapid, smooth and without undue sway or vibration. A positive locking device shall be provided so that the desired angle of elevation can be maintained indefinitely without dependence upon engine power.

As a safeguard feature, the lifting system shall be structurally and hydraulically designed and mounted to prevent rapid descent (lowering) of the ladder unit, in the event of hydraulic hose breakage. In the event of failure of any raising mechanism during operation, the gravity descent of the ladder shall be kept at a speed, which shall prevent damage to the equipment or danger to personnel. Provisions shall be made to prevent damage at full raise or lowering.

EXTENSION AND RETRACTION

The ladder shall be extended by dual hydraulic rams mounted inside the bottom of the base section. The cylinders shall be mounted in the base section and supported through the middle to accommodate the load stress(s) of the ladder.

The hydraulic cylinders shall extend the second section in a manner so that both cylinders hydraulically equalize and provide the additional safety feature of a double extension system. The third and fourth sections shall be connected to the second section of the ladder by two aircraft cables. This design feature shall eliminate the extra weight of hydraulic cylinders on the third and fourth sections should they be horizontally extended to the side of the apparatus.

The design shall be such that the operation hydraulic pressures of the main system shall be as low as possible. Once again, as a safeguard feature, the system shall be structurally and hydraulically designed and mounted to prevent rapid descent (retraction) of the ladder unit should a detachment, failure or hydraulic hose break. In the event of failure of an extension/retraction mechanism during operation, the gravity descent of the ladder shall be kept at a speed, which shall prevent damage to the equipment or danger to personnel. Provisions shall be made to prevent damage at full extension and retraction.

All sections of the ladder shall extend and retract (slide) on special polymer slide blocks. Each slide block shall be bolted into place and shall be removable for inspection and maintenance. There shall be slide blocks throughout the four sections of the ladder for proper alignment and stability.

LOWER TURNTABLE SUPPORT ASSEMBLY

The mainframe assembly shall be mounted midship on the chassis, forward of the pump and over the transmission. This shall leave the rear hose bed open for use of large diameter and regular fire hose. **NO EXCEPTIONS.**

The main frame assembly shall be a solid welded steel box beam structure with welded support gussets fore and aft extending across the chassis frame 35" x 50" in depth. The solid steel box beam structure measurements are important to take shock loads imposed by water turret operation and to give a reserve strength factor to compensate for hose breakage and water hammer.

The overall height of the mainframe assembly measured from ground level to the turntable assembly shall not exceed five feet. This is important in order to keep the center of gravity as low as possible, thus giving the truck superior handling characteristics. An open tube or angle substructure for the mainframe assembly shall not be acceptable.

The mainframe assembly base plate, located at the top of the assembly, which supports and holds the turntable rotation bearing, shall be minimum 1" steel. There shall be a minimum of two solid two inch square tension and compression bars mounted underneath, fore and aft, of the mainframe assembly, which shall tie the ladder and chassis together. The bars shall function to withstand vertical torsional loads. The forward tension and compression bar shall be attached from the rear area of the front spring suspension hanger to the underside area of the mainframe assembly. The rear tension and compression bar shall be attached from the forward area of the rear spring suspension hanger to the underside area of the mainframe assembly.

TURNTABLE

The turntable shall be a minimum of one-inch thick plate and ninety-four (94) inches in diameter. The side plates to which the main base section of the aerial ladder is connected shall have a minimum height of two feet and shall include gussets that shall tolerate the side thrust and tremendous forces to which the unit shall be subject. The turntable shall be equipped with two removable steel sections for access into the pump.

The turntable side plates shall be positioned at a 45-degree angle (opposite the angle of the raise/lower cylinders) to act as a partial counter balance weight on the opposite side of the truck from the ladder extension.

The turntable shall be equipped with a rotating mechanism with a steel balanced fly wheel connected at one end which shall rotate the turntable 360 degrees through a planetary gear box that shall handle torque loads imposed by water hammer and hose breakage. The rotating mechanism shall give the turntable and ladder built in coast as an added safety precaution to avoid lateral ladder side-to-side deflection (reactionary whipping effect) caused by the ladder being stopped suddenly.

The power-operated turntable shall provide continuous rotation of the ladder structure clockwise or counter clockwise, thus enabling the structure to be positioned in any segment through 360 degrees. The rotating mechanism shall also provide sufficient power to rotate the ladder sections in any direction any angle, fully extended, while carrying the manufacturer's rated load capacity with the waterway in operation and discharging

water at the tip of the ladder fly section.

Provisions shall be made for manual operation of the rotation system should loss of hydraulic power occur. This shall be done through manual rotation of the flywheel to rotate the ladder and turntable. There shall also be an emergency means of retracting the ladder and an auxiliary bleed down valve for the hydraulic raise/lower cylinders.

There shall be a minimum of two heavy-duty steel shafts that shall attach the base section of the ladder (at the top and very back) of the ladder to the top portion of the turntable side plates together. The minimum steel shaft measurement shall be 4" long X 3" diameter.

The complete rotation system shall have built in relief to prevent damage from rotating the ladder into buildings or from overloaded water streams. Suitable indicators, clearly visible at all times, shall be provided to facilitate correct alignment of the turntable with the bed of the ladder. An automatic light shall be used to show correct alignment for bedding of the ladder from the turntable control station and the ladder station.

The turntable rotation mechanism shall be provided with an automatically applied brake or self-locking drive. It shall provide braking capacity with all power systems non-functioning to prevent turntable rotation under all rated conditions of loading.

TURNTABLE BEARING

The turntable bearing shall be constructed of steel. There shall be a minimum of 36 drilled and tapped holes in the turntable bearing.

The diameter of the turntable bearing shall be a minimum of 42". The turntable bearing shall be able to rotate 360 degrees in either direction on one-inch thick stainless steel ball bearings. The turntable bearing shall be bolted to the top of the mainframe assembly using a minimum of 36 Grade 8 bolts.

HYDRAULIC SWIVEL

The aerial device shall be equipped with a multi-port hydraulic swivel which shall connect the hydraulic lines from the hydraulic pump and reservoir to the aerial control bank. The hydraulic swivel shall allow for 360 degrees of continuous rotation of the aerial device with no loss of speed or capacity in its function. Aerial control bank is located on the turn table.

ELECTRIC SWIVEL

The ladder shall be equipped with an electric swivel to allow for 360 degrees of continuous rotation of the aerial while connecting all electrical circuits through the rotation point. A programmable controller will manage operation designed specifically for each truck. Envelope control is provided through the programmable controller, sensors, and an encoder.

HYDRAULIC SYSTEM

A flange mounted hydraulic pump, which shall be driven by a power take off unit that is connected to the chassis transmission to provide the power required for operating the ladder. A PTO hour meter shall be provided to record the time when the aerial hydraulic system is engaged.

Said hydraulic system shall have a minimum hydraulic reservoir capacity of sixty-five gallons of special hydraulic fluid. The hydraulic fluid shall be discharged through a refined filter, plus fine mesh stainless steel strainers.

Within said system, pilot operated check valves shall be incorporated so that all valves shall hold in their respective function(s). The hydraulic system shall also incorporate automatic bypasses to compensate in case the ladder is forced into a building or should operator accidentally throw control valve in opposite direction at full speed.

Intercooling of the hydraulic oil shall be accomplished through a built-in heat exchanger to cool oil at all times when fire pump is in operation.

All hydraulic lines shall be of the double braided type with synthetic cover rated at 10,000 lb. burst pressure or above.

A means shall be provided for readily checking and filling the hydraulic reservoir. The fill location shall be conspicuously marked "Hydraulic Oil Only." The manufacturer shall provide proper instructions for checking and filling the hydraulic reservoir.

AUXILIARY HYDRAULIC POWER

A 12-volt auxiliary pump shall be provided to supply emergency power to the hydraulic system. This system shall be operated off the truck batteries and provide limited adequate power to operate the ladder and stabilizer jacks under emergency conditions. **NO EXCEPTIONS**

The auxiliary hydraulic motor shall be located in the stabilizer control station compartment on the left side of the vehicle, next to the jump seat entrance for ease of accessibility and maintenance.

INTERLOCK

An interlock shall be provided that prevents operation of the aerial device until the chassis spring brakes have been set and the transmission has been placed in neutral or the transmission is in the drive position with the driveline to the rear axle disengaged.

A power operated governed engine speed control shall be provided to power the aerial device at normal operating speeds as determined by the manufacturer and this standard.

An interlock shall be provided that allows operation of the engine speed control only after the chassis spring brakes have been set and the transmission is in neutral.

When the unit is equipped with a fire or attack pump, the governed speed control shall be automatically disengaged when the fire or attack pump is operating.

An interlock system shall be provided to prevent the lifting of the aerial device from the travel position until all the stabilizers are in a configuration to meet the stability requirements. The interlock system shall also prevent the moving of the stabilizers unless the aerial device is in the travel position.

STABILIZERS

The stabilizer control station (main hydraulic valve body) shall be located in the compartment directly underneath the turntable next to the crew seat entrance on the left side of the vehicle. The single stabilizer control station shall control all stabilizer operations. The stabilizer control station shall accomplish two important functions: 1] allows person to stay at one centralized location 2] provides faster set up time for the vehicle.

Individual control valves shall be supplied for each mode of stabilizer operation. There shall be a plaque located next to each control valve displaying the function.

A two position hydraulic transfer valve (diverter valve) shall be installed adjacent to the stabilizer control station to direct hydraulic power to either the stabilizer operations or the ladder operations in order to prevent operation of both circuits at the same time.

There shall be three other controls located at the stabilizer control station:

- (a) On/off switch for auxiliary hydraulic motor
- (b) High speed control for hydraulic system
- (c) On/off switch for electrical power to pedestal and ladder

There shall be two stabilizer jacks located in the mainframe assembly. Each stabilizer jack shall consist of a high strength steel tube attached to the stabilizer jack.

Each stabilizer jack shall be furnished with a holding valve and a manually positioned steel pin lock. The pin lock safety feature is designed to not let the stabilizer jack retract should the holding valve bleed off slowly or suddenly.

The midship mounted stabilizer jack rams shall have a minimum bore and stroke of 5" x 23". The ground jacks, when fully extended from the right side to the left side, shall have a maximum spread of 18 feet to provide maximum safety and stability. Also, when the jacks are fully extended, each box beam shall have a minimum of 43" of overlap inside the mainframe assembly, which is extremely crucial for structural integrity, as well as maximum safety and stability. The extendable jacks shall be designed that they may be operated simultaneously

on both sides of the apparatus and horizontally positioned (H type system, out and down) to accommodate obstructions such as curbs, pavement depressions, parked vehicles or any other hindrance.

There shall be two rear jacks located directly behind the rear tandem axle area, one each side of the vehicle, designed to come straight down to take the weight off the rear suspension system. This shall enable the vehicle to be set up in tight or confining spaces with cars, additional fire apparatus, or other obstructions nearby. **NO EXCEPTIONS.**

Any I-beam or contributing structural member, through which the jacks support the weight of the ladder or any position of the apparatus plus the live loads peculiar to firefighting operations, shall be of ample strength to carry these loads without evidence of stress, bending, twisting or other failure(s). As mentioned before, pilot operated check valves shall be included on each jack cylinder and manual pin locks shall be provided for each main stabilizer jack, as additional safety.

There shall be two jack pads of light weight material, one mounted in each stabilizer jack compartment.

The following stability requirements shall be met by the aerial apparatus when it is in a service ready condition, but with all normally removable items such as water, hose, ground ladders, loose equipment, etc., removed. Items mounted on the aerial device by the manufacturer shall remain mounted.

The aerial device shall be capable of sustaining a static load 1-1/2 times its rated capacity in every position in which the aerial device can be placed when the vehicle is on a firm and level surface.

The aerial device shall be capable of sustaining a static load 1-1/3 times its rated capacity in every position in which the aerial device can be placed when the vehicle is on a slope of 5 degrees downward in the direction most likely to cause overturning.

The controls shall be arranged so that the operator may view the stabilizers in motion. An audible alarm of not less than 87 dba at any position the stabilizer can be placed in shall sound when a stabilizer is moving.

The stabilizers shall be deployed in not more than 90 sec. from a stored position to the operating position.

All parts of the stabilizers that protrude beyond the body of the apparatus shall be striped or painted with reflective material so as to indicate a hazard or obstruction.

Stabilizers shall be provided with one or more red warning light(s) visible on the side of the vehicle where the stabilizer is located.

PEDESTAL CONTROLS FOR LADDER OPERATION

An aerial ladder operator's position shall be provided on the apparatus so that the operator is not in contact with the ground. Sign(s) shall be placed to warn the operator(s) of electrocution hazards.

Indicating devices, suitably lighted, clearly marked, and conveniently arranged shall be visible from the

operator's position to:

- (a) Indicate rungs are aligned for climbing
- (b) Indicate the alignment of the aerial ladder with the travel bed
- (c) Indicate elevation and capacity ratings or provide an equivalent load indicating system.

There shall be three pedestal controls located on the pedestal control tower, which shall be positioned on the turntable on the left side of the vehicle when the ladder is in the nested position.

The three pedestal controls shall control the functions of hoisting and lowering, extending and retracting, and rotation of the ladder sections. A guardrail shall be provided at the turntable pedestal control station to prevent personnel from accidentally falling off the vehicle.

The turntable pedestal controls shall be of the manual override type. The control valve employed is the proportional type, which shall allow feathering characteristics during any operation.

The pedestal control station shall have removable panels for access to the hydraulic lines, valves and electrical wiring. There shall also be a hinged cover at the top of the control station for additional access.

The pedestal control station shall be situated so the operator can easily observe the ladder while operating the controls.

Controls suitably lighted, clearly marked, and conveniently arranged shall be provided at the operator's position in order to:

- (a) Elevate and lower the aerial device
- (b) Extend and retract the aerial device
- (c) Rotate the aerial device in either direction
- (d) Operate intercom

The following additional items shall be mounted at the turntable pedestal control station:

- (a) On/off control switch for light to display control station for nighttime operation
- (b) On/off control switch for ladder lights, one light mounted on each side of the ladder
- (c) On/off control switch for high-speed control of the hydraulic system
- (d) A communication system with controls at both locations Plaque displaying functions for pedestal ladder operation

INCLINOMETER

An illuminated inclinometer shall be provided and mounted in plain view of the pedestal operator location.

CENTRALIZED LOCATION OF ALL GROUND CONTROLS

All stabilizer jack controls, turntable pedestal controls and pump controls shall be located in one centralized area to:

- (a) Allow close proximity to all control stations of the truck.
- (b) Allow faster set up time for all operations of the truck

SIGNS AND PLAQUES

Legible, permanent signs that provide operational directions and warning and caution shall be installed in positions readily visible to the operator(s).

Operational direction signs shall describe the function of each control and provide operating instructions.

Warning and caution signs shall indicate hazards inherent in the operation of the aerial ladder. These hazards may include but not be limited to:

Electrical hazards involved where the aerial ladder does not provide protection to the personnel from contact with or near proximity to an electrically charged conductor.

Electrical hazards involved where the aerial ladder does not provide protection to ground personnel who may contact the vehicle when in contact with energized electrical conductors.

Hazards from stabilizer motion.

Hazards that may result from failure to follow manufacturer's operating instructions. Identification signs shall disclose the following information relative to the aerial device:

1. Make
2. Model
3. Insulated or non-insulated
4. Serial Number
5. Date of manufacture
6. Rated load capacity
7. Rated vertical height
8. Rated horizontal reach
9. Maximum hydraulic system pressure, if applicable
10. Hydraulic oil requirements, if applicable

QUALITY CONTROL

The quality control program shall include 100 percent nondestructive testing of all critical structural components of the aerial ladder. The manufacturer shall determine the types of nondestructive testing (NDT) to be conducted. The procedures used for NDT shall comply with the appropriate standards defined in NFPA 1901 2016 Edition, section 19.22.5. All NDT procedures shall be fully documented with respect to extent of examination, method of testing, and inspection techniques. An ASNT Level II NDT technician certified in the

test latest methods shall perform all testing. All NDT testing shall be done in accordance with the American Society for Nondestructive Testing SNT-TC-1A, Recommended Practice. Certified welders under the guidelines of AWS D1.1, Structural Welding Code--Steel, and AWS D1.2, Structural Welding Code--Aluminum, shall perform Welds for all structural load-supporting elements.

WATERWAY

The aerial waterway shall be constructed of heavy duty, light weight, telescopic, aluminum tubing. The water supply line shall come directly off the main pump discharge manifold and shall be piped through smooth high pressure piping without the use of 90 degree chocks joints, to reduce friction loss. The water flow shall be controlled by a full flow ball valve to eliminate any possibility of water hammer on the waterway. The water shall be passed through a special 4" passage rotating swivel designed to also provide hydraulic passages and electrical circuits to the turntable.

Waterway piping immediately above the hydraulic swivel shall have one 90 degree elbow connected to a straight pipe attached to a reinforced stainless steel braided flex tube. There shall be no chocks swivels or multiple bends or twists of the waterway pipe immediately above the hydraulic swivel, which would increase friction loss.

The base section of the waterway shall be a 5" minimum diameter and finish with a 3" diameter in the fifth section of the aerial. The base section shall completely enclose the first section of waterway, thereby protecting it from possible damage from buildings, roof cornices, etc. An automatic relief valve shall be provided in the waterway to eliminate any damage to the waterway by pressure shock or retracting the boom with the drain valve closed.

The waterway shall have the capability of flowing a maximum of 1250 gallons per minute.

POSITIONABLE WATERWAY

The waterway shall have the capability of being secured to the fourth or fifth section of the aerial by means of a lever operated positive locking device. To further enhance the safety of personnel working near the aerial, a permanent stop shall be provided at the end of the ladder, to prevent the waterway from leaving the aerial device.

A simple locking pin system shall not be acceptable. **NO EXCEPTIONS.**

AERIAL SPOT LIGHTS

Four (4) Rigid Industries D2 12V LED lights shall be provided. One (1) shall be mounted on each side of the aerial base section and one (1) each side at the tip of the ladder to illuminate the aerial device for night time operation. The lights shall be activated by a switch near the aerial operator's station.

LADDER LIGHTING SYSTEM

The climbing ladder shall be illuminated by (4) Rigid Industries D2 12V LED lights. The lights shall be spaced along the length of the boom to provide even lighting. The lights shall be activated by one (1) switch at the pump panel.

MONITOR/NOZZLE

There shall be an Akron Brass Style 3480 StreamMaster2 monitor installed on the aerial. This monitor shall be capable of full flow of the aerial waterway up to 2000 G.P.M.. Positioning of the monitor shall be accomplished through electric controls located at the aerial tip, pump panel, and wireless remote control.

This monitor shall be equipped with an Akron 5178 nozzle. The flow pattern shall be adjustable with the electric controls. The nozzle shall have automatic flow rates of 500 - 2000 G.P.M

INTERCOM

A Fire Research ACT Intercom model ICA900-112 two-way system shall be installed between the aerial operator's position and the tip of the ladder. The intercom kit shall include two control modules, one that is hands free and one that has a push-to-talk button, two speakers, and cables. The interconnection between control modules shall require two wires. The control modules shall have an LED volume display and push-button volume control. The hands free module shall constantly transmit to the other module unless the push-to-talk button is pressed.

The intercom shall be designed for exterior use. The control module shall be no more than 2 7/8" high by 5 1/8" wide by 1 7/8". The speaker shall be no more than 5 1/8" high by 5 1/8" wide by 1 1/2" deep. The power requirements for each control module with a speaker shall not exceed 1/2 amp at 12 VDC.

CORROSION REDUCTION POLICY

It is understood that fire apparatus will operate in harsh environments. The manufacturer will have in place a formal corrosion reduction program and detailed assembly procedures, designed for reducing and eliminating the possibility of corrosion. A formal program following the processes as set forth in ASTM B117, and is described below.

Frame Rails

The chassis frame rails shall be coated with a high performance, two component, reinforced inorganic zinc rich primer with a proven cathodic protection makeup preferably Cathacoat 302HB. The surface shall be clean and free of all salts, chalk and oils prior to application. Where the primer has been broken during the frame assembly process the area shall be touched up to reestablish the seal. Prior to finish paint a second primer Devran 201 shall be applied. Once the assembly of the frame is complete and the second primer is applied the entire assembly shall be covered with high quality top coat paint preferably Imron 5000 or equal.

Electro Plating

Steel and Iron brackets such as the pump module bracket shall be Zinc or cadmium plated to protect against corrosion. Plating shall be in accordance with ASTM B663.

Fasteners

In any area that a stainless steel screw or bolt head is to come in contact with aluminum or steel, painted or non-painted, the fastener shall have the underside of the head pre-coated with nylon. The nylon coating shall act as a barrier between the fastener head and the metal or painted surface.

Screw or bolt taped into the metal shall be pre-coated with a Threadlocker type material pre-applied on the threads.

When bolting together stainless steel the pan-head bolts with nylon coating under the head, a stainless washer with a rubber backing, and a Stover flange nut to secure the bolt, shall be utilized.

When mounting aluminum components such as a step to the apparatus body, stainless steel washers with rubber backing shall be used. All mounted components shall utilize barrier material between the two surfaces.

All rivet or huck type fasteners shall be of the same material being secured.

Whenever possible, holes shall be pre-drilled and taped when mounting components such as lights, steps, and hand rails prior to the paint process to reduce the corrosion opportunity. If a hole must be drilled into a previously painted surface, the paint barrier around the hole shall be re-established and a flange-type nutsert with a gasket under the flange shall be used.

When possible, the use of stainless trim screws shall be minimized. Structural tape and or adhesive shall be used where possible for mounting trim to the body or cab.

If a pre-treated screw or bolt is not available, hand applied Dynatex Boltlocker or Theadlocker shall be placed on the threads of the screw, bolt or nutsert. This will help seal threads from moisture and help prevent the fasteners from loosening. If lubricant is used when tapping the hole, the hole will be cleaned of lubricant and the shavings before applying.

Barrier Tape

Barrier tape shall be used on the backsides of all lights, trim pieces, or other components when bolting them to the apparatus; also when attaching stainless steel over an aluminum surface or when attaching aluminum treadplate to the stainless steel. All instances of dis-similar metals contacting each other require the addition of barrier tape between the metals where contact is made.

Before applying the tape, all metal surfaces shall be clean from oil or dirt with a 50/50 mix of alcohol and water or a similar solvent.

Gaskets

Gaskets shall be used under all snaps, loops and fasteners for such items as for hose bed covers. The paint seal shall be re-established around the mounting hole edges after drilling.

Rollup Doors

1 3/4" X 1/16" barrier tape shall be used on the frame opening to act as barrier between the aluminum door rail and the painted door opening surface.

Hinged Doors

Barrier tape shall be applied to the painted surface of the body and on the painted hinge side of the door.

Painting Steel

Steel shall be wiped of any oil residue, rust, and weld slag or smoke shall be removed. All surfaces shall be cleaned with solvent, primed, and then sprayed with a topcoat. After bolts are tightened to the proper torque, bolts shall be touched up with primer or cold galvanizing coating.

Mounting Emergency Lights and Options

All emergency lights, accessory mountings, Kussmaul covers, and 110 outlet boxes mounted to the body should be mounted with pre-coated Threadlocker and nylon under the head screws or bolts to minimize corrosion between dissimilar metals.

Electrical Grounding

Grounding straps shall be installed consisting of a minimum 2-gauge strap bolted to the chassis frame. A ground cable from the cab to the right side frame rail

From the alternator to the right side frame rail

From the pump module frame to the right side truck frame. Aerials: from the hydraulic and pump module framework. From the pump mount to the truck frame rail.

From the body module to the right side truck frame.

Proper grounding will help eliminate grounding problems, and will reduce the possibility for electrolysis and corrosion to occur, as a result of impressed current be presented to the chassis. All electrical connection points shall be sprayed with electrical sealer as necessary.

SALT SPRAY TESTING

All fasteners and coatings have been chosen after extensive salt spray testing. Salt spray tests are used to confirm the relative resistance to corrosion of coated and uncoated metallic specimens, when exposed to a salt spray climate at an elevated temperature. Test specimens are placed in an enclosed chamber and exposed to a continuous indirect spray of neutral (pH 6.5 to 7.2) salt water solution, which falls-out on to the specimens at a rate of 1.0 to 2.0 ml/80cm²/hour, in a chamber temperature of +35C., steady state condition.

Method

Salt fog testing is performed by placing samples in a test cabinet that has been designed in accordance with Paragraph 4 (Apparatus) of ASTM B117 and operated in accordance with Paragraph 10 (Conditions) of ASTM B117.

A 5% salt solution, prepared by dissolving sodium chloride into water that meets the requirements of ASTM

D1193 Specification for Reagent Water, Type IV is supplied to the chamber. At the time the samples are placed into test, the cabinet is pre-conditioned to the operating temperature of 35°C and fogging a 5% salt solution at the specified rate.

Orientation

The samples are placed at a 15-30 degree angle from vertical or tested in the “installed” position. This orientation allows the condensation to run down the specimens and minimizes condensation pooling. An important aspect of the test is the utilization of a free-falling mist, which uniformly settles on the test samples. This simulates a “real world” condition.

Test durations

Test durations are 500 hours, and the test cabinet will remain closed for the duration of the test.

PAINTING

All exposed metal surfaces not chrome plated, polished stainless steel or bright aluminum tread plate shall be thoroughly cleaned and prepared for painting. All irregularities in painted surfaces shall be rubbed down and all seams shall be caulked before the application of the finish coat.

All removable items such as brackets, compartment doors, door hinges, trim, etc. shall be removed and painted separately to insure finish paint behind all mounted items. Body assemblies that cannot be finish painted after assembly shall be finish painted before assembly. Both aluminum and steel surfaces to be painted shall be primed with a two (2) component primer which is compatible with the finish coat. The apparatus shall be finish painted with a polyurethane base/clear system. “No Exception”

Utilizing the stainless steel body fabrication, the interior of all compartments, inside hose bed, and surrounding areas adjacent to compartments doors shall remain a #4 brushed stainless steel finish. This practice shall eliminate the possibility of paint chipping, and electrolysis of aluminum, which can cause corrosive action between dissimilar metals. The chassis, compartment doors, front and rear jack panels, and rear fender panels shall be painted the color indicated.

Prior to reassembly and reinstallation of lights, handrails, door hardware and any miscellaneous items, an isolation tape or gasket material shall be used to prevent damage to the finish painted surfaces. A nylon washer shall be installed under each acorn nut or metal screw that is fastened directly to a painted surface. The following paint process shall be utilized:

Surface Preparation:

1. Wash surface thoroughly with mild detergent.
2. Clean and de-grease with Prep-Sol 3812S.
3. Sand and feather edge using 400 grit or finer on a dual action sander.
4. Remove sanding dust with a cleaner compatible with polyurethane base coat/clear coat final finish. Substrate treatment:
 1. Use a Metal Conditioner followed with a Conversion Coating product. Priming:
 1. Use a priming 615S pretreatment.
 2. Use a self-etching primer applied to achieve a 1.5 mil dft minimum.
 3. Use Prime N Seal sealer compatible with polyurethane base coat. Color Coat:

1. Apply polyurethane base coat 1-2 mil dft minimum. Clear coat:
 1. Apply polyurethane clear coat 2 mil dft minimum.

PAINT-TWO TONE CAB

The cab exterior surfaces shall be two (2) colors. The paint break line shall be at the bottom of the windshield.

PAINTED FRAME

The frame rails, fuel beam, and body subframe shall be painted glossy black.

TURNTABLE PAINT

The turntable, side plates and lift cylinders shall be painted silver.

LETTERING

Forty (40) 6" 22KT Gold laminate gold-leaf letters, with left hand shading and right hand outline to equal 6-5/8" letter, shall be provided.

STRIPING

A 6" Scotchlite stripe shall be provided across the front of the cab and along each side of the apparatus.

"Z" STRIPE

The Scotchlite stripe shall be a one-piece "Z" type on the cab sides and continuing straight along each side of the apparatus.

CHEVRON STRIPING, REAR BODY OUTBOARD, 3M SCOTCHLITE

The apparatus shall have 6" red and yellow reflective 3M Scotchlite Chevron style striping affixed to the outboard rear body panels. The striping will be set in a manner to have the effect of an inverted "V" shape. The stripe will travel low to high from the outside to the inside.

BOOM SIGN

A boom sign, approximately 87" x 10", shall be provided on each side of the boom. The background of the boom sign shall be painted primary truck color.

BOOM SIGN LETTERING

Up to twenty (20) 12" 22KT Gold laminated gold-leaf letters, with left hand shading and right hand outline to equal 12-5/8" letter, shall be provided on each boom sign.

MISCELLANEOUS EQUIPMENT FURNISHED

1 pt. touch-up paint

A bag of stainless steel nuts and bolts, as used in the construction of the apparatus.

PIKE POLE STORAGE

Three (3) storage tubes shall be recessed each side of the rear compartment for pike pole storage. A spring-loaded clip shall be installed near each tube to secure the head of a standard pike pole.

OPERATION AND SERVICE MANUALS

Complete "Operation and Service" manuals shall be supplied with the completed apparatus, one (1) printed copy and one (1) CD. Service manual instructions shall include service, maintenance and troubleshooting for major and minor components of the truck. The apparatus manufacturer shall supply part numbers for major components (i.e. Engine, Axles, Transmission, Pump, etc.). A table of contents, hydraulic, air brake and overall apparatus wiring schematics shall be included. A video demonstration DVD on the operation of the truck shall be supplied with the manuals.

DELIVERY

The custom built fire apparatus shall be driven from the manufacturing facility to the community by a factory trained delivery engineer who shall thoroughly demonstrate the complete apparatus operation and maintenance to the fire department designated personnel.

WARRANTIES

The following warranties shall be supplied at a minimum:

1. The apparatus shall be warranted to be free from mechanical defects in workmanship for a period of three (3) years or 40,000 miles, whichever comes first. The apparatus shall be covered for parts and labor costs associated with repairs for a period of three (3) years or 40,000 miles, whichever comes first.
2. Life-time warranty on the frame
3. Ten (10) year warranty on paint
4. Ten (10) body structural warranty
5. Ten (10) year cab structural warranty
6. Three (3) year aerial mechanical warranty
7. Thirty (30) year aerial structural warranty
8. Manufacturers Warranties for all major components

Detailed warranty documents shall be included for complete coverage on each of these warranties.

MANUFACTURING & LOCATIONS

The apparatus will be manufactured in facilities wholly owned and operated by the company. A complete stock of service parts, and service shall be provided on a 24 hours around the clock basis. The company shall maintain parts and service for a minimum period of twenty (20) years on each apparatus model manufactured. **NO EXCEPTIONS**

COMPARTMENTATION

The dealer shall provide an allowance of \$20,000.00 for compartment shelving and layout.

TRAVEL

The dealer shall provide travel and lodging for three people for three factory trips. The recommended trip schedule would be:

- 1 pre con trip, 5 KFD personnel
- 1 mid con trip, 2 KFD mechanic
- 1 final trip, 3 KFD personnel

ADDITIONAL EQUIPMENT TO BE LISTED POST CONTRACT

The dealer shall allow for and provide a \$9,000.00 fund for equipment to be used by KFD as needed to outfit the truck.

BATTERY POWERED FAN

The dealer shall provide a Blow Hard brand battery operated fan. Model number BH-20.

ENGINE COOLING FAN DISABLE SWITCH

A disable switch shall be installed for the engine cooling fan that shall only be operational when the chassis is in “pump mode”. This switch shall be configured to operate a latching relay configuration and only after pump shifter is placed into “pump mode”. The cooling fan, when disabled, will only be able to engage when the engine temperature reaches cooling fan enable temp as commanded by the ECM. This function shall be deactivated automatically when the pump is placed into “road mode”. The Kenosha Fire Department requests this feature to allow the engine to maintain operating temperature in below freezing temperatures. This allows for a more stable cabin temperature for crew rehab and warming functions. The switch shall be located in a position considered out of the way but accessible by the vehicle operator.

**CITY OF KENOSHA
KENOSHA FIRE DEPARTMENT
ONE (1) NEW AERIAL LADDER FIRE RESCUE UNIT
PROPOSAL NOTICE #03-20
PROPOSAL**

City of Kenosha
Municipal Office Building
625 52nd Street, Room 208
Kenosha, WI. 53140

Purchasing,

We hereby propose to provide and deliver F.O.B. Destination, to City of Kenosha, Station 4 Maintenance Garage, 4810 60th Street, Kenosha, WI. 53142, the equipment specified in this document at the following firm price:

Manufacturer/ Model/ Model Year: _____

Total Cost: \$ _____

Estimated Delivery time: _____ Days from receipt of the purchase order.

Manufacturers Literature Included Yes _____ No _____

Specifications Sheets Completed and Submitted Yes _____ No _____

Warranty: (Please be Specific) _____

Service Facility:

Company Name: _____

Address: _____

Contact Name: _____

Telephone: _____ FAX: _____

E-mail: _____

Payment terms _____%, _____ days, Net _____ days

Respectfully submitted by

Firm: _____

Signature: _____

Print Name: _____

Address: _____

Telephone: _____ FAX: _____

E-mail: _____

Date: _____