Specifications
Fire Pumper

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INTENT OF SPECIFICATIONS

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

The following specifications are a minimum set of specifications, where reasonable superior or equal components and system may be proposed. Gordon County will be the sole judge of “reasonable” and “equal” substitutions. All substitutions shall be noted in the exceptions section of your bid.

The main apparatus body structure shall have an approximate width of 100" in order to maximize the enclosed compartment space of the apparatus. The 100" wide measurement represents the main body structure measured from the bottom, outermost rear corners of the apparatus body structure. Components affixed or fastened to the apparatus will increase the body width proportionately.

OVERALL HEIGHT

The actual overall height of the vehicle shall be approximately 118" (9'-10") from the ground. This measurement shall be taken with the tires properly inflated with the apparatus in the unloaded condition. The actual measurement shall be taken at the highest point of the apparatus.

OVERALL LENGTH

The actual overall length of the vehicle shall be approximately 398" (33'-2").

WHEELBASE

The actual wheelbase of the vehicle shall be approximately 195" (16'-3").

ANGLE OF APPROACH

The actual angle of approach of the vehicle shall be a minimum of 11 degrees.

ANGLE OF A DEPARTURE

The actual angle of departure of the vehicle shall be a minimum of 12 degrees.

CHASSIS

The chassis shall be a Metro Star model. The cab and chassis shall include design considerations for multiple emergency vehicle applications, rapid transit and maneuverability. The chassis shall be manufactured for heavy duty service with the strength and capacity to support a fully laden apparatus, one hundred (100) percent of the time.

MODEL YEAR

The chassis shall have a vehicle identification number that reflects a 2017 model year.

COUNTRY OF SERVICE

The chassis shall be put in service in the country of United States of America (USA).

The chassis will meet applicable U.S.A. federal motor vehicle safety standards per CFR Title 49 Chapter V Part 571 as clarified in the incomplete vehicle book per CFR Title 49 Chapter V Part 568 Section 4 which accompanies each chassis. Spartan Chassis is not responsible for compliance to state, regional, or local regulations. Dealers should identify those regulations and order any necessary optional equipment from Spartan Chassis or their OEM needed to be in compliance with those regulations.

APPARATUS TYPE

The apparatus shall be a pumper vehicle designed for emergency service use which shall be equipped with a permanently mounted fire pump which has a minimum rated capacity of 1250 gallons per minute (3000 L/min). The apparatus shall include a water tank and hose body whose primary purpose is to combat structural and associated fires.

VEHICLE TYPE

The chassis shall be manufactured for use as a straight truck type vehicle and designed for the installation of a permanently mounted apparatus behind the cab. The apparatus of the vehicle shall be supplied and installed by the apparatus manufacturer.

AXLE CONFIGURATION

The chassis shall feature a 4 x 2 axle configuration consisting of a single rear drive axle with a single front steer axle.

GROSS AXLE WEIGHT RATINGS FRONT

The front gross axle weight rating (GAWR) of the chassis shall be 20,000 pounds.

This front gross axle weight rating shall be adequate to carry the weight of the completed apparatus including all equipment and personnel.

GROSS AXLE WEIGHT RATINGS REAR

The rear gross axle weight rating (GAWR) of the chassis shall be 27,000 pounds.

This rear gross axle weight rating shall be adequate to carry the weight of the completed apparatus including all equipment and personnel.

PUMP PROVISION

The chassis shall include provisions to mount a drive line pump in the middle of the chassis, behind the cab, more commonly known as the midship location.

CAB STYLE

The cab shall be a custom, fully enclosed, MFD model with a 10.00 inch raised roof over the driver, officer, and crew area, designed and built specifically for use as an emergency response vehicle by a company specializing in cab and chassis design for all emergency response applications. The cab shall be designed for heavy-duty service utilizing superior strength and capacity for the application of protecting the occupants of the vehicle. This style of cab shall offer up to eight (8) seating positions.

The cab shall incorporate a fully enclosed design with side wall roof supports, allowing for a spacious cab area with no partition between the front and rear sections of the cab. To provide a superior finish by reducing welds that fatigue cab metal; the roof, the rear wall and side wall panels shall be assembled using a combination of welds and proven industrial adhesives designed specifically for aluminum fabrication for construction.

The cab shall be constructed using multiple aluminum extrusions in conjunction with aluminum plate, which shall provide proven strength and the truest, flattest body surfaces ensuring less expensive paint repairs if needed. All aluminum welding shall be completed to the American Welding Society and ANSI D1.2-96 requirements for structural welding of aluminum.

All interior and exterior seams shall be sealed for optimum noise reduction and to provide the most favorable efficiency for heating and cooling retention.

The cab shall be constructed of 5052-H32 corrosion resistant aluminum plate. The cab shall incorporate tongue and groove fitted 6061-T6 0.13 & 0.19 inch thick aluminum extrusions for extreme duty situations. A single formed, one (1) piece extrusion shall be used for the “A” pillar, adding strength and rigidity to the cab as well as additional roll-over protection. The cab side walls and lower roof skin shall be 0.13 inch thick; the rear wall and raised roof skins shall be 0.09 inch thick; the front cab structure shall be 0.19 inch thick.

The exterior width of the cab shall be 94.00 inches wide with a minimum interior width of 88.00 inches. The overall cab length shall be 131.10 inches with 54.00 inches from the centerline of the front of the axle to the back of the cab.

The cab interior shall be designed to afford the maximum usable interior space and attention to ergonomics with hip and legroom while seated which exceeds industry standards. The crew cab floor shall be flat across the entire walking area for ease of movement inside the cab.

The cab shall offer an interior height of 57.50 inches from the front floor to the headliner in the non-raised roof area and a rear floor to headliner height of 65.00 inches in the raised roof area, at a minimum. The cab shall offer an interior measurement at the floor level from the rear of the engine tunnel to the rear wall of the cab of 51.88 inches. All interior measurements shall include the area within the interior trimmed surfaces and not to any unfinished surface.

The cab shall include a driver and officer area with two (2) cab doors large enough for personnel in full firefighting gear. The front doors shall offer a clear opening of 40.25 inches wide X 53.50 inches high, from the cab floor to the top of the door opening. The cab shall also include a crew area with up to two (2) cab doors, also large enough for personnel in full firefighting gear. The rear doors shall offer a clear opening of 32.25 inches wide X 61.00 inches high, from the cab floor to the top of the door opening.

The cab shall incorporate a progressive two (2) step configuration from the ground to the cab floor at each door opening. The progressive steps are vertically staggered and extend the full width of each step well allowing personnel in full firefighting gear to enter and exit the cab easily and safely.

The first step for the driver and officer area shall measure approximately 11.50 inches deep X 31.13 inches wide. The intermediate step shall measure approximately 8.50 inches deep X 32.50 inches wide. The height from the first step to the intermediate step and the intermediate step to the cab floor shall not exceed 11.00 inches.

The first step for the crew area shall measure approximately 11.50 inches deep X 20.44 inches wide. The intermediate step shall measure approximately 10.25 inches deep X 22.75 inches wide. The height from the first step to the intermediate step and the intermediate step to the cab floor shall not exceed 12.80 inches.

CAB FRONT FASCIA

The front cab fascia shall be constructed of 5052-H32 Marine Grade, 0.13 of an inch thick aluminum plate which shall be an integral part of the cab.

The cab fascia will encompass the entire front of the aluminum cab structure from the bottom of the windshield to the bottom of the cab and shall be the “Classic” design.

The front cab fascia shall include two (2) molded plastic modules on each side accommodating a total of up to four (4) Hi/Low beam headlights and two (2) turn signal lights or up to four (4) warning lights. A chrome plated molded plastic bezel shall be provided on each side around each set of four lamps.

FRONT GRILLE

The front fascia shall include a box style, 304 stainless steel front grille 44.45 inches wide X 33.50 inches high X 1.50 inches deep. The grille shall include a minimum free air intake of 732.00 square inches. The upper portion of the grille shall be hinged to provide service access behind the grille.

CAB UNDERCOAT

There shall be a rubberized undercoating applied to the underside of the cab that provides abrasion protection, sound deadening and corrosion protection.

CAB SIDE DRIP RAIL

There shall be a drip rail along the top radius of each cab side. The drip rails shall help prevent water from the cab roof running down the cab side.

CAB PAINT EXTERIOR

The cab shall be painted prior to the installation of glass accessories and all other cab trim to ensure complete paint coverage and the maximum in corrosion protection of all metal surfaces.

All metal surfaces on the entire cab shall be ground by disc to remove any surface oxidation or surface debris which may hinder the paint adhesion. Once the surface is machine ground a high quality acid etching of base primer shall be applied. Upon the application of body fillers and their preparation, the cab shall be primed with a coating designed for corrosion resistance and surface paint adhesion. The maximum thickness of the primer coat shall be 2.00 mils.

The entire cab shall then be coated with an intermediate solid or epoxy surfacing agent that is designed to fill any minor surface defects, provide an adhesive bond between the primer and the paint and improve the color and gloss retention of the color. The finish to this procedure shall be a sanding of the cab with 360 grit paper followed by sealing the seams with SEM brand seam sealer.

The cab shall then be painted the specific color designated by the customer with an acrylic urethane type system designed to retain color and resist acid rain and most atmospheric chemicals found on the fire ground or emergency scene. The paint shall have a minimum thickness of 2.00 mils, followed by a clear top coat not to exceed 2.00 mils. The entire cab shall then be baked at 180 degrees for one (1) hour to speed the curing process of the coatings.

CAB PAINT MANUFACTURER

The cab shall be painted with PPG Industries paint.

CAB PAINT PRIMARY/LOWER COLOR

The primary/lower paint color shall be: Red

CAB PAINT SECONDARY/UPPER COLOR

The secondary/upper paint color shall be: White

CAB PAINT EXTERIOR BREAKLINE

The upper and lower paint shall meet at a breakline on the cab which shall be located approximately 1.00 inch below the door windows on each side of the cab. The breakline shall curve down at the front cab corners to approximately 5.00 inches below the windshields on the front of the cab.

CAB PAINT PINSTRIPE

Where the upper and lower paint colors meet a 0.50 inch wide black pinstripe shall be applied over this break line to offer a more finished look prior to the final pinstripe being installed by the OEM.

CAB PAINT WARRANTY

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

CAB PAINT INTERIOR

The visible interior cab structure surfaces shall be painted with a Zolatone #20-72 silver gray texture finish.

CAB ENTRY DOORS

The cab shall include four (4) entry doors, two (2) front doors and two (2) crew doors designed for ease of entering and egress when outfitted with an SCBA. The doors shall be constructed of extruded aluminum with a nominal thickness of 0.13 inch. The exterior skins shall be constructed of 0.13 inch aluminum plate.

The doors shall include a double rolled style automotive rubber seal around the perimeter of each door frame and door edge which ensures a weather tight fit.

All door hinges shall be hidden within flush mounted cab doors for a pleasing smooth appearance and perfect fit along each side of the cab. Each door hinge shall be piano style with a 0.38 inch pin and shall be constructed of stainless steel.

CAB ENTRY DOOR TYPE

All cab entry doors shall be barrier clear design resulting in exposed lower cab steps. The doors shall provide approximately 32.00 inches of clearance from the ground to the bottom of the door so cab doors may be opened un-hindered by most obstacles encountered, such as guard rails along interstate highways.

CAB INSULATION

The cab ceiling and walls shall include 1.00 inch thick foam insulation. The insulation shall act as a barrier absorbing noise as well as assisting in sustaining the desired climate within the cab interior.

CAB STRUCTURAL WARRANTY

Summary of Warranty Terms:

THE FOLLOWING IS SUMMARY OF WARRANTY TERMS FOR INFORMATION ONLY. THE ACTUAL LIMITED WARRANTY DOCUMENT, WHICH IS ATTACHED TO THIS OPTION, CONTAINS THE COMPLETE STATEMENT OF THE SPARTAN CHASSIS, INC. LIMITED WARRANTY. SPARTAN'S RESPONSIBILITY IS TO BE ACCORDING TO THE TERMS OF THE COMPLETE LIMITED WARRANTY DOCUMENT.

The cab structure shall be warranted for a period of ten (10) years or one hundred thousand (100,000) miles which ever may occur first. The warranty period shall commence on the date the vehicle is delivered to the first end user.

CAB TEST INFORMATION

The cab shall have successfully completed the preload side impact, static roof load application and frontal impact without encroachment to the occupant survival space when tested in accordance with Section 4 of SAE J2420 COE Frontal Strength Evaluation Dynamic Loading Heavy Trucks, Section 5 of SAE J2422 Cab Roof Strength Evaluation Quasi –Static Loading Heavy Trucks and ECE R29 Uniform Provisions Concerning the Approval of Vehicles with regard to the Protection of the Occupants of the Cab of a Commercial Vehicles Annex 3 Paragraph 5.

The above tests have been witnessed by and attested to by an independent third party. The test results were recorded using cameras, high speed imagers, accelerometers and strain gauges. Documentation of the testing shall be provided upon request.

ELECTRICAL SYSTEM

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

DATA RECORDING SYSTEM

The chassis shall have a Weldon Vehicle Data Recorder (VDR) system installed. The system shall be designed to meet NFPA 1901. The following information shall be recorded:

- Vehicle Speed
- Acceleration
- Deceleration
- Engine Speed
- Engine Throttle Position
- ABS Event
- Seat Occupied Status
- Seat Belt Status
- Master Optical Warning Device Switch Position
- Service Brake
- Engine Hours
- Time
- Date

Each portion of the data shall be recorded at the specified intervals and stored for the specified length of time to meet NFPA 1901 guidelines and shall be retrievable by connecting a laptop computer to the VDR system. The laptop connection shall be a panel mounted female type B USB connection point, remotely mounted in the left side foot well of the cab.

ACCESSORY POWER

The electrical distribution panel shall include two (2) power studs. The studs shall be size #10 and each of the power studs shall be circuit protected with a fuse of the specified amperage. One (1) power stud shall be capable of carrying up to a 40 amp battery direct load. One (1) power stud shall be capable of carrying up to a 15 amp ignition switched load. The two (2) power studs shall share one (1) #10 ground stud. A 225 amp battery direct power and ground stud shall be provided and installed on the chassis near the left hand battery box for OEM body connections.

EXTERIOR ELECTRICAL TERMINAL COATING

All terminals exposed to the elements will be sprayed with a high visibility protective rubberized coating to prevent corrosion.

ENGINE

The chassis engine shall be a Cummins ISL9 engine. The ISL9 engine shall be an in-line six (6) cylinder, four cycle diesel powered engine. The engine shall offer a rating of 450 horse power at 2100 RPM and shall be governed at 2200 RPM. The torque rating shall feature 1250 foot pounds of torque at 1400 RPM with 543 cubic inches (8.9 liters) of displacement.

The ISL9 engine shall feature a VGT™ Turbocharger, a high pressure common rail fuel system, fully integrated electronic controls with an electronic governor, and shall be EPA certified to meet the 2013 emissions standards using cooled exhaust gas recirculation and selective catalytic reduction technology.

The engine shall include an engine mounted combination full flow/by-pass oil filter with replaceable spin on cartridge for use with the engine lubrication system. The engine shall include Citgo brand Citgard 500, or equivalent SAE 15W40 CJ4 low ash engine oil which shall be utilized for proper engine lubrication.

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

CAB ENGINE TUNNEL

The cab interior shall include an integrated engine tunnel constructed of 5052-H32 Marine Grade, 0.19 of an inch thick aluminum. The tunnel shall be a maximum of 41.50 inches wide X 25.50 inches high.

DIESEL PARTICULATE FILTER CONTROLS

There shall be two (2) controls for the diesel particulate filter. One (1) control shall be for regeneration and one (1) control shall be for regeneration inhibit.

ENGINE PROGRAMMING HIGH IDLE SPEED

The engine high idle control shall maintain the engine idle at approximately 1250 RPM when engaged.

ENGINE HIGH IDLE CONTROL

The vehicle shall be equipped with a high-idle speed control rocker switch, which shall be pre-set to maintain the engine idle at a pre-determined rate when activated manually. This device shall operate when the master switch is activated and safely interlocked only to function when the transmission is in neutral with the parking brake set.

ENGINE PROGRAMMING ROAD SPEED GOVERNOR

The engine shall include programming which will govern the top speed of the vehicle.

AUXILIARY ENGINE BRAKE

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

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

AUXILIARY ENGINE BRAKE CONTROL

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

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

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

ELECTRONIC ENGINE OIL LEVEL INDICATOR

The engine oil shall be monitored electronically and shall send a signal to activate a warning in the instrument panel when levels fall below normal. The warning shall

activate in a low oil situation upon turning on the master battery and ignition switches without the engine running.

FLUID FILLS

The front of the chassis shall accommodate fluid fill for the engine oil through the grille. This area shall also accommodate a check for the engine oil. The transmission, power steering, and coolant fluid fills and checks shall be under the cab. The windshield washer fill shall be accessible through the front left side mid step.

ENGINE DRAIN PLUG

The engine shall include an original equipment manufacturer installed oil drain plug.

ENGINE WARRANTY

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

REMOTE THROTTLE HARNESS

An apparatus interface wiring harness for the engine and transmission pump interlocks shall be supplied with the chassis. The harness shall include a connector for connection to a chassis pump panel harness supplied by the body builder and shall terminate in the left frame rail behind the cab for connection by the body builder. The harness shall include circuits deemed for a pump panel and shall contain circuits for a hand throttle, and a multiplexed gauge. Separate circuits shall also be included for a pump control switch, “Pump Engaged” and “OK to Pump” indicator lights, open compartment ground, start signal, park brake ground, ignition signal, master power, clean power, customer ignition, air horn solenoid switch, high idle switch and high idle indicator light.

ENGINE PROGRAMMING REMOTE THROTTLE

The engine ECM discreet wire remote throttle circuit will be turned on for use with a discreet wire based pump controller.

ENGINE PROGRAMMING IDLE SPEED

The engine low idle speed will be programmed at 700 rpm.

ENGINE FAN DRIVE

The engine cooling system fan shall incorporate a thermostatically controlled, Horton clutched type fan drive.

When the clutched fan is disengaged it shall facilitate improved vehicle performance, cab heating in cold climates, and fuel economy. The fan clutch design shall be fail safe so that if the clutch drive fails the fan shall engage to prevent engine overheating due to the fan clutch failure.

ENGINE COOLING SYSTEM

There shall be a heavy-duty aluminum cooling system designed to meet the demands of the emergency response industry. The cooling system shall have the capacity 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 requirements specified by the engine and transmission manufacturer and all EPA requirements. The complete cooling system shall be mounted to isolate the entire system from vibration or stress. The individual cores of the cooling system shall be mounted in a manner to allow expansion and contraction at various rates without inducing stress into the adjoining cores.

The cooling system shall utilize 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, an air to air charge air cooler bolted to the front of the radiator, recirculation shields, a shroud, a fan, and required tubing.

The radiator shall be a down-flow design constructed with aluminum cores, plastic end tanks, and a steel frame. The radiator shall be equipped with a drain cock to drain the coolant for serviceability.

The cooling system shall include a one piece injection molded polymer eleven (11) blade fan with a fiberglass fan shroud.

The cooling system shall be equipped with a surge tank that is capable of removing entrained air from the system. The surge tank shall be equipped with a low coolant probe and sight glass to monitor the level of the coolant. The surge tank shall have a dual seal cap that meets the engine manufacturer's pressure requirements, and allows for expansion and recovery of coolant into a separate integral expansion chamber.

All radiator tubes shall be formed from aluminized steel tubing. Recirculation shields shall be installed where required to prevent heated air from reentering the cooling package and affecting performance.

The charge air cooler shall be a cross-flow design constructed completely of aluminum with cast tanks. All charge air cooler tubes shall be formed from aluminized steel tubing and installed with silicone hump hoses and stainless steel “constant torque” style clamps meeting the engine manufacturer’s requirements.

ENGINE COOLING SYSTEM PROTECTION

The engine cooling system shall include a recirculation shield designed to act as a light duty skid plate below the radiator to provide additional protection for the engine cooling system from light impacts, stones, and road debris. The skid plate shall be painted to match the frame color.

ENGINE COOLANT

The cooling package shall include Extended Life Coolant (ELC). The use of ELC provides longer intervals between coolant changes over standard coolants providing improved performance. The coolant shall contain a 50/50 mix of ethylene glycol and de-ionized water to keep the coolant from freezing to a temperature of -34 degrees Fahrenheit.

Proposals offering supplemental coolant additives (SCA) shall not be considered, as this is part of the extended life coolant makeup.

ELECTRONIC COOLANT LEVEL INDICATOR

The instrument panel shall feature a low engine coolant indicator light which shall be located in the center of the instrument panel. An audible tone alarm shall also be provided to warn of a low coolant incident.

ENGINE PUMP HEAT EXCHANGER

A single bundle type coolant to water heat exchanger shall be installed between the engine and the radiator. The heat exchanger shall be designed to prohibit water from the pump from coming in contact with the engine coolant. This shall allow the use of water from the discharge side of the pump to assist in cooling the engine.

COOLANT HOSES

The cooling system hoses shall be silicone heater hose with rubber hoses in the cab interior. The radiator hoses shall be formed silicone coolant hoses with formed aluminized steel tubing. All heater hose, silicone coolant hose, and tubing shall be secured with stainless steel constant torque band clamps.

ENGINE AIR INTAKE

The engine air intake system shall include an ember separator air intake filter which shall be located in the front of the cab behind the right hand side fascia. This filter shall protect the downstream air filter from embers using a combination of unique flat and crimped metal screens constructed into a corrosion resistant steel frame. This multilayered screen shall be designed to trap embers or allow them to burn out before

passing through the pack, while creating only minimal air flow restriction through the system. Periodic cleaning or replacement of the screen shall be all that is required after installation.

The engine shall also include an air intake filter which shall be bolted to the frame and located under the front of the cab on the right hand side. The system shall utilize a replaceable dry type filter which ensures dust and debris remains safely contained inside the housing during operation via leak-tight seals. The service cover shall be located on the bottom of the housing, eliminating the chance of contaminating the air intake system during air filter service.

The air flow distribution and dust loading shall be uniform throughout the high-performance filter element, which shall result in pressure differential for improved horsepower and fuel economy. The air intake ember separator shall be mounted within easy access via a hinged panel behind the right hand side headlight module. The air intake system shall include a restriction indicator light in the warning light cluster on the instrument panel, which shall activate when the air cleaner element requires replacement.

AIR INTAKE PROTECTION

A light duty skid plate shall be supplied for the engine air intake system below the right front side of the cab. The skid plate shall provide protection for the air intake system from light impacts, stones, and road debris. The skid plate shall be painted to match the frame color.

ENGINE EXHAUST SYSTEM

The exhaust system shall be mounted below the frame in the outboard position with the SCR canister in line rearward of the DPF. The exhaust system shall utilize a 90-degree bend in the exhaust tubing from the turbo into a side inlet DPF canister that allows the entire system to be pulled forward. The discharge shall terminate horizontally on the right side of the vehicle ahead of the rear tires.

The exhaust system shall include a diesel particulate filter (DPF), a diesel oxidation catalyst, and a selective catalytic reduction (SCR) catalyst to meet current EPA standards. The selective catalytic reduction catalyst utilizes a diesel exhaust fluid solution consisting of urea and purified water to convert NOx into nitrogen, water, and trace amounts of carbon dioxide. The solution shall be injected into the system through the decomposition tube between the DPF and SCR.

The system shall utilize 0.07 inch thick stainless steel exhaust tubing between the engine turbo and the DPF. Zero leak clamps seal all system joints between the turbo and DPF.

The DPF, the decomposition tube, and the SCR canister through the end of the tailpipe shall be connected with zero leak clamps.

DIESEL EXHAUST FLUID TANK

The exhaust system shall include a molded cross linked polyethylene tank for Diesel Exhaust Fluid (DEF). The tank shall have a capacity of six (6) usable gallons and shall be mounted on the left hand side of the chassis frame behind the batteries below the frame.

The DEF tank shall be designed with capacity for expansion in case of fluid freezing. Engine coolant, which shall be thermostatically controlled, shall be run through lines in the tank to help prevent the DEF from freezing and to provide a means of thawing the fluid if it should become frozen.

The tank fill tube shall be routed under the rear of the cab with the fill neck and splash guard accessible in the top rear step.

ENGINE EXHAUST ACCESSORIES

An exhaust temperature mitigation device shall be shipped loose for installation by the body manufacturer on the vehicle. The temperature mitigation device shall lower the temperature of the exhaust by combining ambient air with the exhaust gasses at the exhaust outlet.

ENGINE EXHAUST WRAP

The exhaust tubing between the engine turbo and the diesel particulate filter (DPF) shall be wrapped with a thermal cover in order to retain the necessary heat for DPF regeneration. The exhaust wrap shall also help protect surrounding components from radiant heat which can be transferred from the exhaust.

TRANSMISSION

The drive train shall include an Allison model EVS 3000 torque converting, automatic transmission which shall include electronic controls. The transmission shall feature two (2) 10-bolt PTO pads located on the converter housing.

The transmission shall include two (2) internal oil filters and Castrol TranSynd™ synthetic TES 295 transmission fluid which shall be utilized in the lubrication of the EVS transmission. An electronic oil level sensor shall be included with the readout located in the shift selector.

The transmission gear ratios shall be:

1st	3.49:1
2nd	1.86:1
3rd	1.41:1
4th	1.00:1
5th	0.75:1

6th 0.65:1 (if applicable)
Rev 5.03:1

TRANSMISSION MODE PROGRAMMING

The transmission, upon start-up, will select five (5) speeds of operation. The sixth speed over drive shall be available with the activation of the mode button on the shifting pad.

TRANSMISSION FEATURE PROGRAMMING

The Allison Gen V-E transmission EVS group package number 127 shall contain the 198 vocational package in consideration of the duty of this apparatus as a pumper. This package shall incorporate an automatic neutral with selector override. This feature commands the transmission to neutral when the park brake is applied, regardless of drive range requested on the shift selector. This requires re-selecting drive range to shift out of neutral for the override.

This package shall be coupled with the use of a split shaft PTO and incorporate pumping circuits. These circuits shall be used allowing the vehicle to operate in the fourth range lockup while operating the pump mode due to the 1 to 1 ratio through the transmission, therefore the output speed of the engine is the input speed to the pump. The pump output can be easily calculated by using this input speed and the drive ratio of the pump itself to rate the gallons of water the pump can provide.

A transmission interface connector shall be provided in the cab. This package shall contain the following input/output circuits to the transmission control module. The Gen V-E transmission shall include prognostic diagnostic capabilities. These capabilities shall include the monitoring of the fluid life, filter change indication, and transmission clutch maintenance.

Function ID	Description	Wire assignment
Inputs		
C	PTO Request	142
J	Fire Truck Pump Mode (4th Lockup)	122 / 123
Outputs		
C	Range Indicator	145 (4th)
G	PTO Enable Output	130
	Signal Return	103

ELECTRONIC TRANSMISSION OIL LEVEL INDICATOR

The transmission fluid shall be monitored electronically and shall send a signal to activate a warning in the instrument panel when levels fall below normal.

TRANSMISSION SHIFT SELECTOR

An Allison pressure sensitive range selector touch pad shall be provided and located to the right of the driver within clear view and easy reach. The shift selector shall have a graphical Vacuum Florescent Display (VFD) capable of displaying two lines of text. The shift selector shall provide mode indication and a prognostic indicator (wrench symbol) on the digital display. The prognostics monitor various operating parameters and shall alert you when a specific maintenance function is required.

TRANSMISSION PRE-SELECT WITH AUXILIARY BRAKE

When the auxiliary brake is engaged, the transmission shall automatically shift to second gear to decrease the rate of speed assisting the secondary braking system and slowing the vehicle.

TRANSMISSION COOLING SYSTEM

The transmission shall include a water to oil cooler system located in the cooling loop between the radiator and the engine. The transmission cooling system shall meet all transmission manufacturer requirements. The transmission cooling system shall feature continuous flow of engine bypass water to maintain uninterrupted transmission cooling.

TRANSMISSION DRAIN PLUG

The transmission shall include an original equipment manufacturer installed magnetic transmission fluid drain plug.

TRANSMISSION WARRANTY

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

PTO LOCATION

The transmission shall have two (2) power take off (PTO) mounting locations, one (1) in the 8:00 o'clock position and one (1) in the 4:00 o'clock position.

DRIVELINE

All drivelines shall be heavy duty metal tube and equipped with Spicer 1710 series universal joints. The shafts shall be dynamically balanced prior to installation to alleviate future vibration. In areas of the driveline where a slip shaft is required, the splined slip joint shall be coated with Glide Coat®.

MIDSHIP PUMP / GEARBOX MODEL

The midship pump/gearbox provisions shall be for a Waterous CSUC20 pump.

MIDSHIP PUMP GEARBOX DROP

The Waterous pump gearbox shall have a “C” (medium length) drop length.

MIDSHIP PUMP RATIO

The ratio for the midship pump shall be 2.27:1.

MIDSHIP PUMP LOCATION C/L SUCTION TO C/L REAR AXLE

The midship pump shall be located so the dimension from the centerline of the suction to the centerline of the rear axle is 80.00 inches.

PUMP SHIFT CONTROLS

One (1) air pump shift control panel shall be mounted in the left switch panel. The following shall be provided on the panel: a three (3) position control lever; an engraved PUMP ENGAGED identification light; and an engraved OK TO PUMP identification light. The pump shift control panel shall be black with a yellow border outline and shall include pump instructions. An instruction plate describing the transmission shift selector position used for pumping shall be provided and located so it can be read from the driver’s position per NFPA 16.10.1.3. The road mode shall be selected when the control lever is in the up position and pump mode shall be selected when the control lever is in the down position.

The control lever center position shall exhaust air from both pump and road sides of the pump gear box shift cylinder.

PUMP SHIFT CONTROL PLUMBING

Air connections shall be provided from the air supply tank to the pump shift control valve and from the pump shift control valve to the frame mounted bracket. The frame mounted bracket shall include labeling identifying the pump and road connection points with threaded 0.38 NPT fittings for attaching the customer installed pump. The air supply shall be pressure protected from service brake system.

FUEL FILTER/WATER SEPARATOR

The fuel system shall have a Fleetguard FS1003 fuel filter/water separator as a primary filter. The fuel filter shall have a drain valve.

A water in fuel sensor shall be provided and wired to an instrument panel lamp and audible alarm to indicate when water is present in the fuel/water separator.

A secondary fuel filter shall be included as approved by the engine manufacturer.

FUEL LINES

The fuel system supply and return lines installed from the fuel tank to the engine shall be reinforced nylon tubing rated for diesel fuel. The fuel lines shall be brown in color and connected with brass fittings.

ELECTRIC FUEL PRIMER

Integral to the engine assembly is an electric lift pump that serves the purpose of pre-filter fuel priming.

FUEL TANK

The fuel tank shall have a capacity of sixty-eight (68) gallons and shall measure 35.00 inches in width X 17.00 inches in height X 29.00 inches in length. The baffled tank shall be made of 14 gauge aluminized steel. The exterior of the tank shall be painted with a PRP Corsol™ black anti-corrosive exterior metal treatment finish. This results in a tank which offers the internal and external corrosion resistance.

The tank shall have a vent port to facilitate venting to the top of the fill neck for rapid filling without "blow-back" and a roll over ball check vent for temperature related fuel expansion and draw.

The tank is designed with dual draw tubes and sender flanges. The tank shall have 2.00 inch NPT fill ports for right or left hand fill. A 0.50 inch NPT drain plug shall be centered in the bottom of the tank.

The fuel tank shall be mounted below the frame, behind the rear axle. Two (2) three-piece strap hanger assemblies with “U” straps bolted midway on the fuel tank front and rear shall be utilized to allow the tank to be easily lowered and removed for service purposes. Rubber isolating pads shall be provided between the tank and the upper tank mounting brackets. Strap mounting studs through the rail, hidden behind the body shall not be acceptable.

FUEL TANK MATERIAL AND FINISH

The fuel tank shall be constructed of 14 gauge aluminized steel. The exterior of the fuel tank shall be painted to match the frame color.

FUEL TANK STRAP MATERIAL

The fuel tank straps shall be constructed of ASTM A-36 steel.

FUEL TANK FILL PORT

The fuel tank fill ports shall be provided with two (2) left fill ports located one (1) in the forward position and one (1) in the middle position and the right fill port located in the middle position of the fuel tank.

FUEL TANK DRAIN PLUG

A 0.5 inch NPT drain plug shall be centered in the bottom of the fuel tank.

FRONT AXLE

The front axle shall be a Meritor Easy Steer Non drive front axle, model number MFS-20. The axle shall include a 3.74 inch drop and a 71.00 inch king pin intersection (KPI). The axle shall include a conventional style hub with a standard knuckle.

FRONT AXLE WARRANTY

The front axle shall be warranted by Meritor for two (2) years with unlimited miles under the general service application. Details of the Meritor warranty are provided on the PDF document attached to this option.

FRONT WHEEL BEARING LUBRICATION

The front axle wheel bearings shall be lubricated with oil. The oil level can be visually checked via clear inspection windows in the front axle hubs.

FRONT SHOCK ABSORBERS

Two (2) Bilstein inert, nitrogen gas filled shock absorbers shall be provided and installed as part of the front suspension system. The shocks shall be a monotubular design and fabricated using a special extrusion method, utilizing a single blank of steel without a welded seam, achieving an extremely tight peak-to-valley tolerance and maintains consistent wall thickness. The monotubular design shall provide superior strength while maximizing heat dissipation and shock life.

The ride afforded through the use of a gas shock is more consistent and shall not deteriorate with heat, the same way a conventional oil filled hydraulic shock would.

The Bilstein front shocks shall include a digressive working piston assembly allowing independent tuning of the compression and rebound damping forces to provide optimum ride and comfort without compromise. The working piston design shall feature fewer parts than most conventional twin tube and “road sensing” shock designs and shall contribute to the durability and long life of the Bilstein shock absorbers.

Proposals offering the use of conventional twin tube or “road sensing” designed shocks shall not be considered.

FRONT SUSPENSION

The front suspension shall include a nine (9) leaf spring pack in which the longest leaf measures 54.00 inch long and 4.00 inches wide and shall include a military double wrapped front eye. Both spring eyes shall have a case hardened threaded bushing installed with lubrication counter bore and lubrication land off cross bore with grease fitting. The spring capacity shall be rated at 21,500 pounds.

STEERING COLUMN/ WHEEL

The cab shall include a Douglas Autotech steering column which shall include a seven (7) position tilt, a 2.25 inch telescopic adjustment, and an 18.00 inch, four (4) spoke steering wheel located at the driver’s position. The steering wheel shall be covered with black polyurethane foam padding.

The steering column shall contain a horn button, self-canceling turn signal switch, four-way hazard switch and headlamp dimmer switch.

ELECTRONIC POWER STEERING FLUID LEVEL INDICATOR

The power steering fluid shall be monitored electronically and shall send a signal to activate an audible alarm and visual warning in the instrument panel when fluid level falls below normal.

POWER STEERING PUMP

The hydraulic power steering pump shall be a TRW PS and shall be gear driven from the engine. The pump shall be a balanced, positive displacement, sliding vane type.

FRONT AXLE CRAMP ANGLE

The chassis shall have a front axle cramp angle of 48-degrees to the left and 44-degrees to the right.

POWER STEERING GEAR

The power steering gear shall be a TRW model TAS 65 with an assist cylinder.

CHASSIS ALIGNMENT

The chassis frame rails shall be measured to insure the length is correct and cross checked to make sure they run parallel and are square to each other. The front and rear axles shall be laser aligned. The front tires and wheels shall be aligned and toe-in set on the front tires by the chassis manufacturer.

REAR AXLE

The rear axle shall be a Meritor model RS-25-160 single drive axle. The axle shall include precision forged, single reduction differential gearing, and shall have a fire service rated capacity of 27,000 pounds.

The axle shall be built of superior construction and quality components to provide the rugged dependability needed to stand up to the fire industry's demands. The axle shall include rectangular shaped, hot-formed housing with a standard wall thickness of 0.63 of an inch for extra strength and rigidity and a rigid differential case for high axle strength and reduced maintenance.
The axle shall have heavy-duty Hypoid gearing for longer life, greater strength and quieter operation. Industry-standard wheel ends for compatibility with both disc and drum brakes, and unitized oil seal technology to keep lubricant in and help prevent contaminant damage will be used.

REAR AXLE DIFFERENTIAL LUBRICATION

The rear axle differential shall be lubricated with oil.

REAR AXLE WARRANTY

The rear axle shall be warranted by Meritor for two (2) years with unlimited miles under the general service application. Details of the Meritor warranty are provided on the PDF document attached to this option.

REAR WHEEL BEARING LUBRICATION

The rear axle wheel bearings shall be lubricated with oil.

VEHICLE TOP SPEED

The top speed of the vehicle shall be approximately 68 MPH +/-2 MPH at governed engine RPM.

REAR SUSPENSION

The single rear axle shall feature a Reyco 79KB vari-rate, self-leveling captive slipper type conventional multi-leaf spring suspension, with 57.50 inch X 3.00 inch springs. One (1) adjustable and one (1) fixed torque rod shall be provided.

The rear suspension capacity shall be rated from 21,000 to 31,500 pounds.

FRONT TIRE

The front tires shall be Michelin 385/65R22.5 “L” tubeless radial XFE regional tread.

The front tire stamped load capacity shall be 19,840 pounds per axle with a speed rating of 65 miles per hour when properly inflated to 130 pounds per square inch.

The Michelin Tire Intermittent Service Rating load capacity shall be 20,000 pounds per axle with a speed rating of 75 miles per hour when properly inflated to 120 pounds per square inch. The Michelin Intermittent Service Rating limits the operation of the emergency vehicle to one (1) hour of loaded travel with a one (1) hour cool down prior to another loaded run.

REAR TIRE

The rear tires shall be Michelin 12R-22.5 16PR "H" tubeless radial XDN2 all-weather tread.

The rear tire stamped load capacity shall be 27,120 pounds per axle with a speed rating of 75 miles per hour when properly inflated to 120 pounds per square inch.
The Michelin Tire Intermittent Service Rating load capacity shall be 28,880 pounds per axle with a speed rating of 75 miles per hour when properly inflated to 120 pounds per square inch. The Michelin Intermittent Service Rating limits the operation of the emergency vehicle to one (1) hour of loaded travel with a one (1) hour cool down prior to another loaded run.

REAR AXLE RATIO

The rear axle ratio shall be 5.63:1.

TIRE PRESSURE INDICATOR

There shall be a voucher provided with the chassis for a pop up style tire pressure indicator at each tire valve stem. The indicator shall provide visual indication of pressure in the specific tire.

The tire pressure indicators shall be redeemed upon the vehicle manufacturer’s receipt of the voucher for installation by the customer.

FRONT WHEEL

The front wheels shall be Alcoa hub piloted, 22.50 inch X 12.25 inch LvL One™ polished aluminum wheels. The hub piloted mounting system shall provide easy installation and shall include two-piece flange nuts. The wheels shall feature one-piece forged strength and a polished finish that lasts.

REAR WHEEL

The outer rear wheels shall be Alcoa hub piloted, 22.50 inch X 8.25 inch LvL One™ aluminum wheels with a polished outer surface. The inner rear wheels shall be Alcoa hub piloted, 22.50 inch X 8.25 inch aluminum wheels with LvL One™ bright machine finish. The hub piloted mounting system shall provide easy installation and shall include two-piece flange nuts.

WHEEL TRIM

The front wheels shall include stainless steel lug nut covers and stainless steel baby moons. The baby moons shall have cutouts for oil seal viewing when applicable.

The rear wheels shall include stainless steel lug nut covers and band mounted spring clip stainless steel high hats.

The lug nut covers, baby moons, and high hats shall be RealWheels® brand constructed of 304L grade, non-corrosive stainless steel with a mirror finish. Each wheel trim component shall meet D.O.T. certification.

TIRE CHAINS

Onspot brand six (6) strand automatic ice chains shall be installed on the rear axle of the chassis to provide instant traction while traveling on ice and snow at speeds below 35 MPH.

TIRE CHAINS ACTIVATION

The tire chain system shall be activated by a locking switch on the dash to deter accidental activation. The light on the switch shall illuminate when the tire chains are engaged. The tire chains shall be interlocked with the transmission and shall engage only if the vehicle is traveling 30 MPH or less. After traveling over 30 MPH, the vehicle must be reduced to a speed below 5 MPH for the tire chains to be engaged or re-engaged.

BRAKE SYSTEM

A rapid build-up air brake system shall be provided. The air brakes shall include a two (2) air tank, three (3) reservoir system with a total of 4152 cubic inch of air capacity. A floor mounted treadle valve shall be mounted inside the cab for graduated control of applying and releasing the brakes. An inversion valve shall be installed to provide controlled service brake application during the unlikely event of primary air supply loss. All air reservoirs provided on the chassis shall be labeled for identification.

The rear axle spring brakes shall automatically apply in any situation when the air pressure falls below 25 PSI and shall include a mechanical means for releasing the spring brakes when necessary. An audible alarm shall designate when the system air pressure is below 60 PSI.

A four (4) sensor, four (4) modulator Anti-lock Braking System (ABS) shall be installed on the front and rear axles in order to prevent the brakes from locking or skidding while braking during hard stops or on icy or wet surfaces. This in turn shall allow the driver to maintain steering control under heavy braking and in most instances, shorten the braking distance. The electronic monitoring system shall incorporate diagonal circuitry which shall monitor wheel speed during braking through a sensor and tone ring on each wheel. A dash mounted ABS lamp shall be provided to notify the driver of a system malfunction. The ABS system shall automatically disengage the auxiliary braking system device when required. The speedometer screen shall be capable of reporting all active defaults using PID/SID and FMI standards.

Additional safety shall be accommodated through Automatic Traction Control (ATC) which shall be installed on the single rear axle. The ATC system shall apply the ABS when the drive wheels loose traction. The system shall scale the electronic engine throttle back to prevent wheel spin while accelerating on ice or wet surfaces.

A momentary rocker style switch shall be provided and properly labeled “mud/snow”. When the switch is pressed once, the system shall allow a momentary wheel slip to obtain traction under extreme mud and snow conditions. During this condition the ATC light and the light on the rocker switch shall blink continuously notifying the driver of activation. Pressing the switch again shall deactivate the mud/snow feature.

FRONT BRAKES

The front brakes shall be Meritor 16.50 inch x 6.00 inch S-cam drum type.

REAR BRAKES

The rear brakes shall be Meritor 16.50 inch X 7.00 inch S-cam drum type. The brakes shall feature a cast iron shoe.

PARK BRAKE

Upon application of the push-pull valve in the cab, the rear brakes will engage via mechanical spring force. This is accomplished by dual chamber rear brakes, satisfying the FMVSS parking brake requirements.

PARK BRAKE CONTROL

A Meritor-Wabco manual hand control push-pull style valve shall operate the parking brake system. The control shall be yellow in color.

The parking brake actuation valve shall be mounted 6.00 inches to the left of center of the dash within easy access of the driver.

FRONT BRAKE SLACK ADJUSTERS

The front brakes shall include Meritor automatic slack adjusters installed on the chassis which features a simple, durable design offering reduced weight. The automatic slack adjusters shall feature a manual adjusting nut which cannot inadvertently be backed off and threaded grease fittings for easy serviceability.

REAR BRAKE SLACK ADJUSTERS

The rear brakes shall include Meritor automatic slack adjusters installed on the axle which features a simple, durable design offering reduced weight. The automatic slack adjusters shall feature a manual adjusting nut which cannot inadvertently be backed off and threaded grease fittings for easy serviceability.

AIR DRYER

The brake system shall include a Wabco System Saver 1200 air dryer with an integral heater with a Metri-Pack sealed connector. The air dryer incorporates an internal turbo cutoff valve that closes the path between the air compressor and air dryer purge valve during the compressor "unload" cycle. The turbo cutoff valve allows purging of moisture and contaminants without the loss of turbo boost pressure. The air dryer shall be mounted behind the battery box on the left hand side.

FRONT BRAKE CHAMBERS

The front brakes shall be provided with MGM type 30 brake chambers.

REAR BRAKE CHAMBERS

The rear axle shall include TSE 30/36 brake chambers which shall convert the energy of compressed air into mechanical force and motion. This shall actuate the brake camshaft, which in turn shall operate the foundational brake mechanism forcing the

brake shoes against the brake drum. The TSE Type 36 brake chamber has a 36.00 square inch effective area.

AIR COMPRESSOR

The air compressor provided for the engine shall be a Wabco® SS318 single cylinder pass-through drive type compressor which shall be capable of producing 18.7 CFM at 1200 engine RPMs. The air compressor shall feature a higher delivery efficiency translating to more air delivery per horsepower absorbed. The compressor shall include an aluminum cylinder head which shall improve cooling, reduce weight and decrease carbon formation. Superior piston and bore finishing technology shall reduce oil consumption and significantly increasing the system component life.

AIR GOVERNOR

An air governor shall be provided to control the cut-in and cut-out pressures of the engine mounted air compressor. The governor shall be calibrated to meet FMVSS requirements. The air governor shall be located on the air dryer bracket on the left frame rail behind the battery box.

MOISTURE EJECTORS

Automatic moisture ejectors with a manual drain provision shall be installed on all reservoirs of the air supply system.

AIR SUPPLY LINES

The air system on the chassis shall be plumbed with color coded reinforced nylon tubing air lines. The primary (rear) brake line shall be green, the secondary (front) brake line red, the parking brake line orange and the auxiliary (outlet) will be blue.

Brass compression type fittings shall be used on the nylon tubing. All drop hoses shall include fiber reinforced neoprene covered hoses.

REAR AIR TANK MOUNTING

If a combination of wheel base, air tank quantity, or other requirements necessitate the location of one or more air tanks to be mounted rear of the fuel tank, these tank(s) will be mounted perpendicular to frame.

WHEELBASE

The chassis wheelbase shall be 195.00 inches.

FRAME

The frame shall consist of double rails running parallel to each other with cross members forming a ladder style frame. The frame rails shall be formed in the shape of a "C" channel, with the outer rail measuring 10.25 inches high X 3.50 inches deep upper and lower flanges X 0.38 inches thick with an inner channel of 9.44 inches high X 3.13 inches deep and 0.38 inches thick. Each rail shall be constructed of 110,000 psi minimum yield high strength low alloy steel. Each double rail section shall be rated by a Resistance Bending Moment (RBM) minimum of 3,213,100 inch pounds and have a minimum section modulus of 29.21 cubic inches. The frame shall measure 35.00 inches in width.

Proposals calculating the frame strength using the “box method” shall not be considered.

Proposals including heat treated rails shall not be considered. Heat treating frame rails produces rails that are not uniform in their mechanical properties throughout the length of the rail. Rails made of high strength, low alloy steel are already at the required yield strength prior to forming the rail.

A minimum of seven (7) fully gusseted 0.25 inch thick cross members shall be installed. The inclusion of the body mounting, or bumper mounting shall not be considered as a cross member. The cross members shall be attached using zinc coated grade 8 fasteners. The bolt heads shall be flanged type, held in place by distorted thread flanged lock nuts. Each cross member shall be mounted to the frame rails utilizing a minimum of 0.25 inch thick gusset reinforcement plates at all corners balancing the area of force throughout the entire frame.
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Any proposals not including additional reinforcement for each cross member shall not be considered.

All relief areas shall be cut in with a minimum 2.00 inch radius at intersection points with the edges ground to a smooth finish to prevent a stress concentration point.

The frame and cross members shall carry a lifetime warranty to the original purchaser. A copy of the frame warranty shall be made available upon request.
Proposals offering warranties for frames not including cross members shall not be considered.

FRAME WARRANTY

Summary of Warranty Terms:

THE FOLLOWING IS SUMMARY OF WARRANTY TERMS FOR INFORMATION ONLY. THE ACTUAL LIMITED WARRANTY DOCUMENT, WHICH IS ATTACHED TO THIS OPTION, CONTAINS THE COMPLETE STATEMENT OF THE SPARTAN CHASSIS, INC. LIMITED WARRANTY. SPARTAN’S RESPONSIBILITY IS TO BE

ACCORDING TO THE TERMS OF THE COMPLETE LIMITED WARRANTY DOCUMENT.

The frame and cross members shall carry a limited lifetime warranty to the original purchaser. The warranty period shall commence on the date the vehicle is delivered to the first end user.

FRAME CLEAR AREA

The chassis frame shall be left clear of chassis mounted components inside or outside the frame rails within the first 30.00 inches behind the cab to allow space for OEM installed components. Cross members may be installed in the clear area if required for proper frame or driveline configuration.

FRAME PAINT

The frame shall be powder coated black prior to any attachment of components.

All powder coatings, primers and paint shall be compatible with all metals, pretreatments and primers used. The cross hatch adhesion test per ASTM D3359 shall not have a fail of more than ten (10) squares. The pencil hardness test per ASTM D3363 shall have a final post-curved pencil hardness of H-2H. The direct impact resistance test per ASTM D2794 shall have an impact resistance of 120.00 inches per pound at 2 mils.

Any proposals offering painted frame with variations from the above process shall not be accepted. The film thickness of vendor supplied parts shall also be sufficient to meet the performance standards as stated above.

FRONT BUMPER

A one piece, two (2) rib wrap-around style, polished stainless steel front bumper shall be provided. The material shall be 10 gauge 304 stainless steel, 12.00 inches high and 99.00 inches wide.

FRONT BUMPER EXTENSION LENGTH

The front bumper shall be extended approximately 24.00 inches ahead of the cab.

FRONT BUMPER EXTENSION FRAME WIDTH

The front bumper extension frame shall feature an overall width of 48.25 inches.

MECHANICAL SIREN

The front bumper shall include an electro mechanical Federal Q2B™ siren, which shall be streamlined, chrome-plated and shall produce 123 decibels of sound at 10.00 feet. The Q2B™ siren produces a distinctive warning sound that is recognizable at long distances. A unique clutch design provides a longer coast down sound while reducing the amp draw to 100 amps. The siren shall measure 10.50 inches wide X 10.00 inches high X 14.00 inches deep. The siren shall include a pedestal mount to surface mount on a horizontal surface.

AIR HORN

The front bumper shall include two (2) Hadley brand E-Tone air horns which shall measure 21.00 inches long with a 6.00 inch round flare. The air horns shall be trumpet style with a chrome finish on the exterior and a painted finish deep inside the trumpet.

AIR HORN LOCATION

The air horns shall be recess mounted in the front bumper face on the left side of the bumper in the inboard and outboard positions relative to the left hand frame rail.

AIR HORN RESERVOIR

One (1) air reservoir, with a 1200 cubic inch capacity, shall be installed on the chassis to act as a supply tank for operating air horns. The reservoir shall be isolated with a 90 PSI pressure protection valve on the reservoir supply side to prevent depletion of the air to the air brake system.

ELECTRONIC SIREN SPEAKER

There shall be one (1) Cast Products Inc. model SA4301, 100 watt speaker provided. The speaker shall measure 6.20 inches tall X 7.36 inches wide X 3.06 inches deep. The speaker shall include a flat mounting flange which shall be polished aluminum.

ELECTRONIC SIREN SPEAKER LOCATION

The electronic siren speaker shall be located on the front bumper face on the right side outboard of the frame rail in the far outboard position.

AUXILIARY ELECTRONIC SIREN SPEAKER

There shall be one (1) Cast Products Inc. model SA4301, 100 watt auxiliary electronic siren speaker provided. The speaker shall measure 6.20 inches tall X 7.36 inches wide X 3.06 inches deep. The speaker shall include a flat mounting flange which shall be polished aluminum.

AUXILIARY ELECTRONIC SIREN SPEAKER LOCATION

The auxiliary electronic siren speaker shall be located in the bumper fascia centered between the frame rails.

FRONT BUMPER TOW HOOKS

Two (2) heavy duty tow hooks, painted to match the chassis frame, shall be installed in a rearward position out of the approach angle area, bolted directly to the side of the chassis frame with grade 8 bolts.

CAB TILT SYSTEM

The entire cab shall be capable of tilting approximately 45-degrees to allow for easy maintenance of the engine and transmission. The cab tilt pump assembly shall be located on the right side of the chassis above the battery box.

The electric-over-hydraulic lift system shall include an ignition interlock and red cab lock down indicator lamp on the tilt control which shall illuminate when holding the “Down” button to indicate safe road operation.

It shall be necessary to activate the master battery switch and set the parking brake in order to tilt the cab. As a third precaution the ignition switch must be turned off to complete the cab tilt interlock safety circuit.

Two (2) spring-loaded hydraulic hold down hooks located outboard of the frame shall be installed to hold the cab securely to the frame. Once the hold-down hooks are set in place, it shall take the application of pressure from the hydraulic cab tilt lift pump to release the hooks.

Two (2) cab tilt cylinders shall be provided with velocity fuses in each cylinder port. The cab tilt pivots shall be 1.90 inch ball and be anchored to frame brackets with 1.25 inch diameter studs.

A steel safety channel assembly, painted safety yellow shall be installed on the right side cab lift cylinder to prevent accidental cab lowering. The safety channel assembly shall fall over the lift cylinder when the cab is in the fully tilted position. A cable release system shall also be provided to retract the safety channel assembly from the lift cylinder to allow the lowering of the cab.

CAB TILT AUXILIARY PUMP

A manual cab tilt pump module shall be attached to the cab tilt pump housing.

CAB TILT CONTROL RECEPTACLE

The cab tilt control cable shall include a receptacle which shall be temporarily located on the right hand chassis rail rear of the cab to provide a place to plug in the cab tilt remote control pendant. The tilt pump shall include 8.00 feet of cable with a six (6) pin Deutsch receptacle with a cap.

The remote control pendant shall include 20.00 feet of cable with a mating Deutsch connector. The remote control pendant shall be shipped loose with the chassis.

CAB WINDSHIELD

The cab windshield shall have a surface area of 2825.00 square inches and be of a two (2) piece wraparound design for maximum visibility.

The glass utilized for the windshield shall include standard automotive tint. The left and right windshield shall be fully interchangeable thereby minimizing stocking and replacement costs.

Each windshield shall be installed using black self locking window rubber.

GLASS FRONT DOOR

The front cab doors shall include a window which is 27.00 inches in width X 26.00 inches in height. These windows shall have the capability to roll down completely into the door housing. This shall be accomplished manually utilizing a crank style handle on the inside of the door. A reinforced window regulator assembly shall be provided for severe duty use.

There shall be an irregular shaped fixed window which shall measure 2.50 inches wide at the top, 8.00 inches wide at the bottom X 26.00 inches in height, more commonly known as “cozy glass” ahead of the front door roll down windows.

The windows shall be mounted within the frame of the front doors trimmed with a black anodized ring on the exterior.

GLASS TINT FRONT DOOR

The windows located in the left and right front doors shall have a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

GLASS REAR DOOR RH

The rear right hand side door shall include a window which is 27.00 inches in width X 26.00 inches in height. This window shall roll up and down manually utilizing a crank style handle on the inside of the door. A reinforced window regulator assembly shall be provided for severe duty use.

GLASS TINT REAR DOOR RIGHT HAND

The window located in the right hand side rear door shall include a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

GLASS REAR DOOR LH

The rear left hand side door shall include a window which is 27.00 inches in width X 26.00 inches in height. This window shall roll up and down manually utilizing a crank style handle on the inside of the door. A reinforced window regulator assembly shall be provided for severe duty use.

GLASS TINT REAR DOOR LEFT HAND

The window located in the left hand side rear door shall include a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

GLASS SIDE MID RH

The cab shall include a window on the right side behind the front and ahead of the crew door which shall measure 16.00 inches wide X 26.00 inches high. This window shall be fixed within this space and shall be rectangular in shape. The window shall be mounted using self locking window rubber. The glass utilized for this window shall include a green automotive tint unless otherwise noted.

GLASS TINT SIDE MID RIGHT HAND

The window located on the right hand side of the cab between the front and rear doors shall include a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

GLASS SIDE MID LH

The cab shall include a window on the left side behind the front door and ahead of the crew door and above the wheel well which shall measure 16.00 inches wide X 26.00 inches high. This window shall be fixed within this space and shall be rectangular in shape. The window shall be mounted using self locking window rubber. The glass utilized for this window shall include a green automotive tint unless otherwise noted.

GLASS TINT SIDE MID LEFT HAND

The window located on the left hand side of the cab between the front and rear doors shall include a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

CLIMATE CONTROL

The cab shall include a 57,500 BTU @ 425 CFM front overhead heater/defroster which shall be provided and installed above the windshield between the sun visors.

The cab shall also include a combination heater air-conditioning unit mounted on the engine tunnel. This unit shall offer eight (8) adjustable louvers, four (4) forward facing and four (4) rearward facing, a temperature control valve and two (2) blowers offering three (3) speeds which shall be capable of circulating 550 cubic feet of air per minute. The unit shall be rated for 42,500 BTU/Hr of cooling and 36,000 BTU/Hr of heating. The temperature and blower controls shall be located on the heater/air conditioning unit.

All defrost/heating systems shall be plumbed with one (1) seasonal shut-off valve at the front corner on the right side of the cab.

The air conditioner lines shall be a mixture of custom bend zinc coated steel fittings and Aero-quip GH 134 flexible hose with Aero-quip EZ clip fittings.

CLIMATE CONTROL DRAIN

The climate control system shall include a gravity drain for water management. The gravity drain shall remove condensation from the air conditioning system without additional mechanical assistance.

CLIMATE CONTROL ACTIVATION

The heating and defrosting controls shall be located on the front overhead climate control unit. There shall be additional heating and air conditioning controls located on the engine tunnel mounted climate control unit.

A/C CONDENSER LOCATION

A roof mounted A/C condenser shall be installed centered on the cab forward of the raised roof against the slope rise.

A/C COMPRESSOR

The air-conditioning compressor shall be a belt driven, engine mounted, open type compressor that shall be capable of producing a minimum of 32,000 BTU at 1500 engine RPMs. The compressor shall utilize R-134A refrigerant and PAG oil.

CAB CIRCULATION FANS FRONT

The cab shall include two (2) all metal 6.00 inch air circulation fans installed overhead in the center of the cab rearward of the windshield. Each fan shall be controlled by an individual toggle switch on each fan. The fans can be used to help defog the windshield or to increase air circulation for passenger comfort.

UNDER CAB INSULATION

The underside of the cab tunnel surrounding the engine shall be lined with multi-layer insulation, engineered for application inside diesel engine compartments.
The insulation shall act as a noise barrier, absorbing noise thus keeping the decibel level in the cab well within NFPA recommendations. As an additional benefit, the insulation shall assist in sustaining the desired temperature within the cab interior.

The engine tunnel insulation shall measure approximately 0.75 inch thick including a vertically lapped polyester fiber layer, a 1.0 lb/ft^2 PVC barrier layer, an open cell foam layer, and a moisture and heat reflective foil facing reinforced with a woven fiberglass layer. The foil surface acts as protection against moisture and other contaminants. The insulation shall meet or exceed FMVSS 302 flammability test.

The insulation shall be cut precisely to fit each section and sealed for additional heat and sound deflection. The insulation shall be held in place by 3 mils of acrylic pressure sensitive adhesive and aluminum pins with hard hat, hold in place fastening heads.

INTERIOR TRIM FLOOR

The floor of the cab shall be covered with a multi-layer mat consisting of 0.25 inch thick sound absorbing closed cell foam with a 0.06 inch thick non-slip vinyl surface with a pebble grain finish. The covering shall be held in place by a pressure sensitive adhesive and aluminum trim molding. All exposed seams shall be sealed with silicone caulk matching the color of the floor mat to reduce the chance of moisture and debris retention.

INTERIOR TRIM

The cab interior shall include trim on the front ceiling, rear crew ceiling, and the cab walls. It shall be easily removable to assist in maintenance. The trim shall be constructed of insulated vinyl over a hard board backing.

REAR WALL INTERIOR TRIM

The rear wall of the cab shall be trimmed with vinyl.

HEADER TRIM

The cab interior shall feature header trim above the driver and officer positions constructed of vacuum formed ABS material.

TRIM CENTER DASH

The main center dash area shall be constructed of durable vacuum formed ABS composite.

TRIM LH DASH

The left hand dash shall be a one (1) piece durable vacuum formed ABS composite housing which shall be custom molded for a perfect fit around the instrument panel. The left hand dash shall offer lower vertical surface area to the left and right of the steering column to accommodate control panels.

TRIM RH DASH

The right hand dash trim shall consist of a vacuum formed ABS composite module, which contains a glove compartment with a hinged locking door and a Mobile Data Terminal (MDT) provision. The glove compartment size shall be 13.50 inches wide X 6.25 inches high X 5.50 inches deep. The MDT provision shall be provided above the glove compartment.

ENGINE TUNNEL TRIM

The cab engine tunnel shall be covered with a multi-layer mat consisting of 0.25 inch closed cell foam with a 0.06 inch thick non-slip vinyl surface with a pebble grain finish. The mat shall be held in place by pressure sensitive adhesive. The engine tunnel mat shall be trimmed with anodized aluminum stair nosing trim for an aesthetically pleasing appearance.

POWER POINT DASH MOUNT

The cab shall include one (1) 12 volt cigarette lighter type receptacle installed in the switch panel to provide a power source for 12 volt electrical equipment. The receptacle shall be wired battery direct.

STEP TRIM

Each cab entry door shall include a three step entry. The first step closest to the ground shall be constructed of polished 5032 H32 aluminum Grip Strut® grating with angled outer corners. The step shall feature a splash guard to reduce water and debris from splashing in to the step. The splash guard shall have an opening on the outer edge to allow debris and water to flow through rather than becoming trapped within the stepping

surface. The lower step shall be mounted to a frame which is integral with the construction of the cab for rigidity and strength. The middle step shall be integral with the cab construction and shall be trimmed with a Flex-Tred® adhesive grit surface material.

UNDER CAB ACCESS DOOR

The cab shall include an aluminum access door in the left crew step riser painted to match the cab interior paint with a push and turn latch. The under cab access door shall provide access to the diesel exhaust fluid fill.

INTERIOR DOOR TRIM

The interior trim on the doors of the cab shall consist of an aluminum panel constructed of Marine Grade 5052-H32 0.13 of an inch thick aluminum plate. The door panels shall include a painted finish.

DOOR TRIM CUSTOMER NAMEPLATE

The interior door trim on the front doors shall include a customer nameplate which states the vehicle was custom built for their Department.

CAB DOOR TRIM REFLECTIVE

The interior of each door shall include high visibility reflective tape. A white reflective tape shall be provided vertically along the outer rear edge of the door. The lowest portion of each door skin shall include a reflective tape chevron with red and white stripes. The chevron tape shall measure 6.00 inches in height.

INTERIOR GRAB HANDLE "A" PILLAR

There shall be two (2) rubber covered 11.00 inch grab handles installed inside the cab, one on each “A” post at the left and right door openings. The left handle shall be located 7.88 inches above the bottom of the door window opening and the right handle shall be located 2.88 inches above the bottom of the door window opening. The handles shall assist personnel in entering and exiting the cab.

INTERIOR GRAB HANDLE FRONT DOOR

Each front door shall include one (1) ergonomically contoured 9.00 inch cast aluminum handle mounted horizontally on the interior door panels. The handles shall feature a textured black powder coat finish to assist personnel entering and exiting the cab.

INTERIOR GRAB HANDLE REAR DOOR

A black powder coated cast aluminum assist handle shall be provided on the inside of each rear crew door. A 30.00 inch long handle shall extend horizontally the width of the

window just above the window sill. The handle shall assist personnel in exiting and entering the cab.

INTERIOR SOFT TRIM COLOR

The cab interior soft trim surfaces shall be gray in color.

INTERIOR TRIM SUNVISOR

The header shall include two (2) sun visors, one each side forward of the driver and officer seating positions above the windshield. Each sun visor shall be constructed of Masonite and covered with padded vinyl trim.

INTERIOR ABS TRIM COLOR

The cab interior vacuum formed ABS composite trim surfaces shall be gray in color.

INTERIOR FLOOR MAT COLOR

The cab interior floor mat shall be gray in color.

CAB PAINT INTERIOR DOOR TRIM

The inner door panel surfaces shall be painted with Zolatone #20-72 silver gray texture finish.

DASH PANEL GROUP

The main center dash area shall include three (3) removable panels located one (1) to the right of the driver position, one (1) in the center of the dash and one (1) to the left of the officer position. The center panel shall be within comfortable reach of both the driver and officer.

SWITCHES CENTER PANEL

The center dash panel shall include twelve (12) rocker switch positons in a single row across the top of the panel.

A rocker switch with a blank legend installed directly above shall be provided for any position without a switch and legend designated by a specific option. The non-specified switches shall be two-position, black switches with a green indicator light. Each blank switch legend can be custom engraved by the body manufacturer. All switch legends shall have backlighting provided.

SWITCHES LEFT PANEL

The left dash panel shall include eight (8) switches. There shall be five (5) switches across the top of the panel and three (3) below the three (3) right-most switches of the top row. Three (3) of the top row of switches shall be rocker type and the left two (2) shall be the headlight switch and instrument lamp dimmer switch. The remaining switches shall consist of one (1) windshield wiper/washer control switch and two (2) rocker type switches.

A rocker switch with a blank legend installed directly above shall be provided for any position not designated by a specific option. The non-designated switches shall be two-position, black switches with a green indicator light. Each blank switch legend can be custom engraved by the body manufacturer. All switch legends shall have red backlighting provided.

SWITCHES RIGHT PANEL

The right dash panel shall include no rocker switches or legends.

SEAT BELT WARNING

A Weldon seat belt warning system, integrated with the Vehicle Data Recorder system, shall be installed for each seat within the cab. The system shall activate an indicator light in the instrument panel, a digital seat position indicator with a seat position legend in the switch panel, and an audible alarm.

The warning system shall activate when any seat is occupied with a minimum of 60 pounds and the corresponding seat belt remains unfastened. The warning system shall also activate when any seat is occupied and the corresponding seat belt was fastened in an incorrect sequence. Once activated, the visual indicators and audible alarm shall remain active until all occupied seats have the seat belts fastened.

SEAT MATERIAL

The seats shall be covered with Turnout Tuff™ rugged material. Turnout Tuff material is rip-stop weave nylon laminated with a polyurethane backing and is water repellent to 75 PSI to protect seats from being saturated or contaminated by fluids. The material meets FMVSS 302 flammability requirements.

SEAT COLOR

All seats supplied with the chassis shall be gray in color. All seats shall include red seat belts.

SEAT BACK LOGO

The seat back shall include the apparatus manufacturer's logo. The logo shall be centered on the standard headrest of the seat back and on the left side of a split headrest.

SEAT DRIVER

The driver's seat shall be a Seats Inc. 911 Battalion series with a ten-way adjustable seat. The seat shall feature six-way electric adjustability up and down, fore and aft with 7.25 inches of travel, and seat rake. The seat shall also include lumbar and recline manual adjustment.

The seat shall feature an all belts to seat (ABTS) style of safety restraint. The ABTS feature shall include a three-point shoulder harness with the lap belt, automatic retractor and buckle as an integral part of the seat assembly. The buckle portion of the seat belt shall be mounted on a semi-rigid stalk extending from the seat base within easy reach of the occupant.

The minimum vertical dimension from the seat H-point to the ceiling for this belted seating position shall be 35.00 inches measured with the seat height adjusted to the lowest position of travel.

This model of seat shall have successfully completed the static load tests set forth by FMVSS 207/210. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. This model of seat installed in the cab model, as specified, shall have successfully completed the dynamic sled testing using FMVSS 208 as a guide with the following accommodations. In order to reflect the larger size outfitted firefighters, the test dummy used shall be a 95th percentile hybrid III male weighing 225 pounds rather than the 50th percentile male dummy weighing 165 pounds as referenced in FMVSS 208.

The materials used in construction of the seat shall also have successfully completed testing with regard to the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which dictates the allowable burning rate of materials in the occupant compartments of motor vehicles.

SEAT BACK DRIVER

The driver's seat shall include a standard seat back incorporating the all belts to seat feature (ABTS). The seat back shall feature a contoured head rest.

SEAT MOUNTING DRIVER

The driver's seat shall be installed in an ergonomic position in relation to the cab dash.

SEAT OFFICER

The officer's seat shall be a Seats Inc. 911 Battalion series. The seat shall feature a tapered and padded seat, cushion. The seat shall feature electric six-way adjustable positioning. The six (6) positions shall include up and down and fore and aft. The control shall be located centered under the front of the seat.

The seat shall feature an all belts to seat (ABTS) style of safety restraint. The ABTS feature shall include a three-point shoulder harness with the lap belt, automatic retractor and buckle as an integral part of the seat assembly.

The minimum vertical dimension from the seat H-point to the ceiling for this belted seating position shall be 35.00 inches measured with the seat height adjusted to the lowest position of travel.

This model of seat shall have successfully completed the static load tests by FMVSS 207/210. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. This model of seat installed in the cab model, as specified, shall have successfully completed the dynamic sled testing using FMVSS 208 as a guide with the following accommodations. In order to reflect the larger size outfitted firefighters, the test dummy used shall be a 95th percentile hybrid III male weighing 225 pounds rather than the 50th percentile male dummy weighing 165 pounds as referenced in FMVSS 208. The model of seats shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which decides the burning rate of materials in the occupant compartments of motor vehicles.

SEAT BACK OFFICER

The officer seat back shall include a Ziamatic brand Quic-Lock® model QLM-U mechanical self contained breathing apparatus (SCBA) bracket. The Mechanical walk away bracket shall meet NFPA 1901-03 9G dynamic requirements for cylinder restraint systems for use in crew compartments of fire truck cabs. The brackets shall be third Party tested to ten (10) times the force of gravity.

The bracket shall secure a self-contained breathing apparatus with all sizes of cylinders. The bracket shall feature a top clamp and a footplate which securely lock the SCBA. The top clamp shall be PVC coated to prevent damage to the cylinder. The steel back plate and cast aluminum footplate shall be powder coated. The bracket shall also include a release cable which when pulled releases the cylinder.

The seat back shall include a removable padded cover which shall be provided over the SCBA cavity.

SEAT MOUNTING OFFICER

The officer’s seat shall be installed in an ergonomic position in relation to the cab dash.

POWER SEAT WIRING

The power seat or seats installed in the cab shall be wired directly to battery power.

SEAT BELT ORIENTATION CREW

The crew position seat belts shall follow the standard orientation which extends from the outboard shoulder extending to the inboard hip.

SEAT FORWARD FACING CENTER LOCATION

The crew area shall include two (2) forward facing center crew seats with both located at the center of the rear wall.

SEAT CREW FORWARD FACING CENTER

The crew area shall include a seat in the forward facing center position which shall be a Seats Inc. 911 Battalion series. The seat shall feature a tapered and padded seat, and cushion. The seat shall be mounted in a fixed position.

The seat shall feature an all belts to seat (ABTS) style of safety restraint. The ABTS feature shall include a three-point shoulder harness with the lap belt and automatic retractor as an integral part of the seat assembly. The buckle portion of the seat belt shall extend from the seat base towards the driver position within easy reach of the occupant.

The minimum vertical dimension from the seat H-point to the ceiling for each belted seating position shall be 35.00 inches.

This model of seat shall have successfully completed the static load tests by FMVSS 207/210. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. This model of seat installed in the cab model, as specified, shall have successfully completed the dynamic sled testing using FMVSS 208 as a guide with the following accommodations. In order to reflect the larger size outfitted firefighters, the test dummy used shall be a 95th percentile hybrid III male weighing 225 pounds rather than the 50th percentile male dummy weighing 165 pounds as referenced in FMVSS 208. The model of seats shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which decides the burning rate of materials in the occupant compartments of motor vehicles.

SEAT BACK FORWARD FACING CENTER

The forward facing center seat back(s) shall include a Ziamatic brand Quic-Lock® model QLM-U mechanical self contained breathing apparatus (SCBA) bracket. The

Mechanical walk away bracket shall meet NFPA 1901-03 9G dynamic requirements for cylinder restraint systems for use in crew compartments of fire truck cabs. The brackets shall be third Party tested to ten (10) times the force of gravity.

The bracket shall secure a self-contained breathing apparatus with all sizes of cylinders. The bracket shall feature a top clamp and a footplate which securely lock the SCBA. The top clamp shall be PVC coated to prevent damage to the cylinder. The steel back plate and cast aluminum footplate shall be powder coated. The bracket shall also include a release cable which when pulled releases the cylinder.

The seat back shall include a removable padded cover which shall be provided over the SCBA cavity.

SEAT FRAME FORWARD FACING

The forward facing center seating positions shall include an enclosed style seat frame located and installed at the rear wall. The seat frame shall measure 62.38 inches wide X 12.38 inches high X 22.00 inches deep. The seat frame shall be constructed of Marine Grade 5052-H32 0.19 inch thick aluminum plate. The seat box shall be painted with the same color as the remaining interior.

SEAT FRAME FORWARD FACING STORAGE ACCESS

There shall be two (2) access points to the seat frame storage area, one (1) on each side of the seat frame. Each access point shall be covered by a hinged door which measures 15.00 inches in width X 10.63 inches in height.

SEAT MOUNTING FORWARD FACING CENTER

The forward facing center seats shall offer a special mounting. The seats shall be installed 16.00 inches apart offering additional room for each occupant.

CAB FRONT UNDERSEAT STORAGE ACCESS

The left and right under seat storage areas shall have a solid aluminum hinged door with non-locking latch.

SEAT COMPARTMENT DOOR FINISH

All underseat storage compartment access doors shall have a Zolatone #20-72 silver gray texture.

WINDSHIELD WIPER SYSTEM

The cab shall include a dual arm wiper system which shall clear the windshield of water, ice and debris. There shall be two (2) windshield wipers which shall be affixed to a radial wet arm. The system shall include a single motor which shall initiate the arm in which both the left hand and right hand windshield wipers are attached, initiating a back and forth motion for each wiper. The wiper motor shall be activated by an intermittent wiper control located within easy reach of the driver's position.

ELECTRONIC WINDSHIELD FLUID LEVEL INDICATOR

The windshield washer fluid level shall be monitored electronically. When the washer fluid level becomes low the yellow "Check Message Center" indicator light on the instrument panel shall illuminate and the message center in the dual air pressure gauge shall display a "Check Washer Fluid Level" message.

CAB DOOR HARDWARE

The cab entry doors shall be equipped with exterior pull handles, suitable for use while wearing firefighter gloves. The handles shall be made of aluminum with a chrome plated finish.

The interior exit door handles shall be flush paddle type with a black finish, which are incorporated into the upper door panel.

All cab entry doors shall include locks which are keyed alike. The door locks shall be designed to prevent accidental lockout.

The exterior pull handles shall include a scuff plate behind the handle constructed of polished stainless steel to help protect the cab finish.

DOOR LOCKS

Each cab entry door shall include a manually operated door lock. Each door lock may be actuated from the inside of the cab by means of a red knob located on the paddle handle of the respective door or by using a TriMark key from the exterior. The door locks are designed to prevent accidental lock out.

GRAB HANDLES

The cab shall include one (1) 18.00 inch knurled, anti-slip, one-piece exterior assist handle behind each cab door. The grab handle shall be made of 14 gauge 304-stainless steel and be 1.25 inch diameter to enable non-slip assistance with a gloved hand.

REARVIEW MIRRORS

Retrac Aerodynamic West Coast style single vision mirror heads model 613275 shall be provided and installed on each of the front cab doors.

The mirrors shall be mounted via 1.00 inch diameter tubular stainless steel arms to provide a rigid mounting to reduce mirror vibration.

The mirrors shall measure 8.00 inches wide X 19.00 inches high and shall include an 8.00 inch convex mirrors with a stainless steel back, model 980-4, installed below the flat glass to provide a wider field of vision. The flat mirrors shall be motorized with remote horizontal and vertical adjustment. The control switches shall be mounted within easy reach of the driver. The convex mirrors shall be manually adjustable. The flat mirror glass shall be heated for defrosting in severe cold weather conditions.

The mirrors shall be constructed of a vacuum formed chrome plated ABS plastic housing that is corrosion resistant and shall include the finest quality non-glare glass.

REARVIEW MIRROR HEAT SWITCH

The heat for the rearview mirrors shall be controlled through a rocker switch on the dash in the switch panel.

CAB FENDER

Full width wheel well liners shall be installed on the extruded cab to limit road splash and enable easier cleaning. Each two-piece liner shall consist of an inner liner 16.00 inches wide made of vacuum formed ABS composite and an outer fenderette 3.50 inches wide made of 14 gauge 304 polished stainless steel.

MUD FLAPS FRONT

The front wheel wells shall have mud flaps installed on them.

CAB EXTERIOR FRONT & SIDE EMBLEMS

The cab shall include three (3) Spartan Chassis emblems. There shall be one (1) for the front air intake grille and two (2) emblems with integrated model nameplates for the exterior sides of the cab shipped loose for installation by the body manufacturer.

CAB EXTERIOR MODEL NAMEPLATE

The cab shall include custom “Metro Star” nameplates integrated into the side emblem.

IGNITION

A master battery system with a keyless start ignition system shall be provided. Each system shall be controlled by a one-quarter turn Cole Hersee switch, both of which shall be mounted to the left of the steering wheel on the dash. A chrome push type starter button shall be provided adjacent to the master battery and ignition switches.

Each switch shall illuminate a green LED indicator light on the dash when the respective switch is placed in the “ON” position.

The starter button shall only operate when both the master battery and ignition switches are in the “ON” position.

BATTERY

The single start electrical system shall include six (6) Harris BCI 31 950 CCA batteries with a 210 minute reserve capacity and 4/0 welding type dual path starter cables per SAE J541.

BATTERY TRAY

The batteries shall be installed within two (2) steel battery trays located on the left side and right side of the chassis, securely bolted to the frame rails. The battery trays shall be coated with the same material as the frame.

The battery trays shall include drain holes in the bottom for sufficient drainage of water. A durable, non-conducting, interlocking mat made by Dri-Dek shall be installed in the bottom of the trays to allow for air flow and help prevent moisture build up. The batteries shall be held in place by non-conducting phenolic resin hold down boards.

BATTERY BOX COVER

Each battery box shall include a steel cover which protects the top of the batteries. Each cover shall include flush latches which shall keep the cover secure as well as a black powder coated handle for convenience when opening.

BATTERY CABLE

The starting system shall include cables which shall be protected by 275 degree F. minimum high temperature flame retardant loom, sealed at the ends with heat shrink and sealant.

BATTERY JUMPER STUD

The starting system shall include battery jumper studs. These studs shall be located in the forward most portion of the driver's side lower step. The studs shall allow the vehicle

to be jump started, charged, or the cab to be raised in an emergency in the event of battery failure.

ALTERNATOR

The charging system shall include a 320 amp Leece-Neville 12 volt alternator. The alternator shall include a self-exciting integral regulator.

BATTERY CONDITIONER

A Kussmaul 1200 battery conditioner shall be supplied. The battery conditioner shall be mounted in the cab in the area between the driver seat and the LH rear facing outer seat position.

BATTERY CONDITIONER DISPLAY

A Kussmaul battery conditioner display shall be supplied. The battery conditioner display shall be mounted in the cab, viewable through the cab mid side window behind the left front door.

AUXILIARY AIR COMPRESSOR

A Kussmaul Auto Pump 120V air compressor shall be supplied. The air compressor shall be installed behind the officer's seat. The air compressor shall be plumbed to the air brake system to maintain air pressure.

ELECTRICAL INLET

A Kussmaul 20 amp super auto-eject electrical receptacle shall be supplied. It shall automatically eject the plug when the starter button is depressed.

A single item or an addition of multiple items must not exceed the rating of the electric inlet that it’s connected to.

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

ELECTRICAL INLET LOCATION

An electrical inlet shall be installed on the left hand side of cab over the wheel well.

ELECTRICAL INLET CONNECTION

The electrical inlet shall be connected to the battery conditioner and the air pump.

ELECTRICAL INLET COLOR

The electrical inlet connection shall include a yellow cover.

HEADLIGHTS

The cab front shall include four (4) rectangular halogen headlamps with separate high and low beams mounted in bright chrome bezels.

FRONT TURN SIGNALS

The front fascia shall include two (2) Whelen model 600 4.00 inch X 6.00 inch programmable amber LED turn signals which shall be installed in a polished aluminum housing above and outboard of the front warning and head lamps.

HEADLIGHT LOCATION

The headlights shall be located on the front fascia of the cab directly below the front warning lights.

SIDE TURN/MARKER LIGHTS

The sides of the cab shall include two (2) Truck-Lite 10250Y LED round side marker lights which shall be grommet mounted just behind the front cab radius corners.

MARKER AND ICC LIGHTS

In accordance with FMVSS, there shall be five (5) LED cab marker lamps designating identification, center and clearance provided. These lights shall be installed on the face of the cab within full view of other vehicles from ground level.

HEADLIGHT AND MARKER LIGHT ACTIVATION

The headlights and marker lights shall be controlled through a rocker switch within easy reach of the driver. There shall be a dimmer switch within easy reach of the driver to adjust the brightness of the dash lights. The headlamps shall be equipped with the

"Daytime Running" light feature, which shall illuminate the headlights to 80% brilliance when the battery master switch is in the "On" position and the parking brake is released.

GROUND LIGHTS

Each door shall include an LED NFPA compliant ground light mounted to the under side of the cab step below each door. The lights shall include a polycarbonate lens, a housing which is vibration welded and LEDs which shall be shock mounted for extended life. The ground lighting shall be activated by the respective door as well as rocker switched.

LOWER CAB STEP LIGHTS

The middle step located at each door shall include a recess mounted 4.00 inch round LED light which shall activate with the opening of the respective door.

INTERMEDIATE STEP LIGHTS

The intermediate step well area at each door shall include an LED light within a chrome housing. The Egress step lights shall provide visibility to the step well area for the first step exiting the vehicle. The Egress step lights shall activate with Entry step lighting.

ENGINE COMPARTMENT LIGHT

There shall be an incandescent NFPA compliant light mounted under the engine tunnel for area work lighting on the engine. The light shall include a polycarbonate lens, a housing which is vibration welded and a bulb which shall be shock mounted for extended life. The light shall activate automatically when the cab is tilted.

INTERIOR OVERHEAD LIGHTS

The cab shall include a two-section, red and clear Weldon incandescent dome lamp located over each door. The dome lamps shall be rectangular in shape and shall measure approximately 9.50 inches in length X 5.00 inches in width with a black colored bezel. The clear portion of each lamp shall be activated by opening the respective door and both the red and clear portions can be activated by individual switches on each lamp.

An additional incandescent three (3) light module with dual map lights shall be located over the engine tunnel which can be activated by individual switches on the lamp.

DO NOT MOVE APPARATUS LIGHT

The front headliner of the cab shall include a flashing red light clearly labeled "Do Not Move Apparatus". In addition to the flashing red light, an audible alarm shall be included which shall sound while the light is activated.

The flashing red light shall be 6.00 inches long X 2.50 inches wide X 1.75 inches high and shall be located centered left to right for greatest visibility.

The light and alarm shall be interlocked for activation when either a cab door is not firmly closed or an apparatus compartment door is not closed, and the parking brake is released.

MASTER WARNING SWITCH

A master switch shall be included in the main rocker switch panel. The switch shall be a rocker type, red in color and labeled “Master” for identification. The switch shall feature control over all devices wired through it. Any warning device switch left in the “ON” position shall automatically power up when the master switch is activated.

INBOARD FRONT WARNING LIGHTS

The cab front fascia shall include two (2) Whelen 600 series Super LED front warning lights in the left and right inboard positions. The lights shall feature multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors. The lights shall be mounted to the front fascia of the cab within a chrome bezel.

INBOARD FRONT WARNING LIGHTS COLOR

The warning lights mounted on the cab front fascia in the inboard positions shall be red with a clear lens.

OUTBOARD FRONT WARNING LIGHTS

The cab front fascia shall include two (2) Whelen 600 series Super LED front warning lights in the left and right outboard positions. The lights shall feature multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors. The lights shall be mounted to the front fascia of the cab within a chrome bezel.

OUTBOARD FRONT WARNING LIGHTS COLOR

The warning lights mounted on the cab front fascia in the outboard position shall be red with a clear lens.

FRONT WARNING SWITCH

The front warning lights shall be controlled via rocker switch on the panel. This switch shall be clearly labeled for identification.

INTERSECTION WARNING LIGHTS

The chassis shall include two (2) Whelen 600 series Super LED intersection warning lights, one (1) each side. The lights shall feature multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors.

INTERSECTION WARNING LIGHTS COLOR

The intersection lights shall be red with a clear lens.

INTERSECTION WARNING LIGHTS LOCATION

The intersection lights shall be mounted on the side of the bumper in the rearward position.

SIDE WARNING LIGHTS

The cab sides shall include two (2) Whelen 600 series Super LED warning lights, one (1) on each side. The lights shall feature multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors. The lights shall be mounted to the sides of the cab within a chrome bezel.

SIDE WARNING LIGHTS COLOR

The warning lights located on the side of the cab shall be red with clear lens.

SIDE WARNING LIGHTS LOCATION

The warning lights on the side of the cab shall be mounted over the front wheel well directly over the center of the front axle.

SIDE AND INTERSECTOR WARNING SWITCH

The side and intersector warning lights shall be controlled by a rocker switch on the switch panel. This switch shall be clearly labeled for identification.

SIREN CONTROL HEAD

A Whelen 295HFS2 electronic siren control head with remote amplifier shall be provided and flush mounted in the switch panel with a location specific to the customer's needs. The siren shall feature 200-watt output, hands free mode and shall be in "standby" mode awaiting instruction. The siren shall offer radio broadcast, public address, wail, yelp, or piercer tones and hands free operation which shall allow the operator to turn the siren on and off from the horn ring if a horn/siren selector switch option is also selected.

HORN BUTTON SELECTOR SWITCH

A rocker switch shall be installed in the switch panel between the driver and officer to allow control of either the electric horn or the air horn from the steering wheel horn button. The electric horn shall sound by default when the selector switch is in either position to meet FMCSA requirements.

AIR HORN ACTIVATION

The air horn activation shall be accomplished through the steering wheel button for the driver and by two (2) lanyard cables, one (1) on the left hand side accessible to the driver and one (1) on the right hand side accessible to the officer. An air horn activation circuit shall be provided to the chassis harness pump panel harness connector.

MECHANICAL SIREN ACTIVATION

The mechanical siren shall be actuated by two (2) Linemaster model SP491-S81 foot switches. One (1) shall be mounted in the front section of the cab for use by the driver and one (1) shall be shipped loose with an angled bracket for installation by the OEM. A red momentary siren brake rocker switch shall be provided in the switch panel on the dash.

The siren shall only be active when master warning switch is on to prevent accidental engagement.

BACK-UP ALARM

An ECCO model 575 backup alarm shall be installed at the rear of the chassis with an output level of 107 dB. The alarm shall automatically activate when the transmission is placed in reverse.

INSTRUMENTATION

An ergonomically designed instrument panel shall be provided. Each gauge shall be backlit with LED lamps. Stepper motor movements shall drive all gauges. The instrumentation system shall be multiplexed and shall receive ABS, engine, and transmission information over the J1939 data bus to reduce redundant sensors and wiring.

The instrument panel shall contain the following gauges:

One (1) electronic speedometer shall be included. The primary scale on the speedometer shall read from 0 to 100 MPH, and the secondary scale on the speedometer shall read from 0 to 160 KM/H.

One (1) electronic tachometer shall be included. The scale on the tachometer shall read from 0 to 3000 RPM.

One (1) two-movement gauge displaying primary system, and secondary system air volumes and integral LCD odometer/trip odometer shall be included on the lower portion of the LCD. The scale on the air pressure gauges shall read from 0 to 150 pounds per square inch (PSI). The air pressure scales shall be linear to operate with an accuracy of 1 degree of the measured data with a red indication zone on the gauge showing critical levels of air pressure. A red indicator light in the gauge shall indicate a low air pressure, as well as a message on the LCD screen. The odometer shall display up to 9,999,999.9 miles. The trip odometer shall display 9,999.9 miles. The LCD shall display Transmission Temperature in degrees Fahrenheit on the upper portion of the LCD. The LCD screen shall also be capable of displaying certain diagnostic functions.

One (1) four-movement gauge displaying engine oil pressure, coolant temperature, fuel level, voltmeter, and an *indicator bar displaying Diesel Exhaust Fluid (DEF) LED bar shall be included. The scale on the engine oil pressure gauge shall read from 0 to 120 pounds per square inch (PSI). The engine oil pressure scale shall be linear to operate with an accuracy of 1 degree of the measured. A red indicator light in the gauge shall indicate a low engine oil pressure, as well as a message on the LCD screen. The scale on the coolant temperature gauge shall read from 100 to 250 degrees Fahrenheit (F). The coolant temperature scale shall be linear to operate with an accuracy of 1 degree of the measured data with a red indication zone on the gauge showing critical levels of air pressure. A red indicator light in the gauge shall indicate high coolant temperature, as well as a message on the LCD screen. The scale on the fuel level gauge shall read from empty to full as a percentage of fuel remaining. An amber indicator light shall indicate low fuel at 25% tank level. The scale on the voltmeter shall read from 10 to 16 volts with a red indication zone on the gauge showing critical levels of battery voltage. A red indicator light shall indicate high or low system voltage, as well as a message on the LCD screen. The scale on the DEF LED bar will consist of four (4) LEDs displaying levels in increments of 25% of useable DEF in green. Upon decreasing levels, the indicator bar will change colors to notify the driver of decreasing levels of DEF and action will be required. An amber indicator light shall indicate low levels of DEF, as well as a message on the LCD screen and an audible alarm.

The instrument panel shall include a light bar that contains the following LED indicator lights and produce the following audible alarms in applicable configurations:

RED LAMPS

Stop Engine-indicates critical engine fault
Air Filter Restricted-indicates excessive engine air intake restriction
Park Brake-indicates parking brake is set
Seat Belt Indicator-indicates when a seat is occupied and corresponding seat belt remains unfastened
Low Coolant-indicates engine coolant is required

AMBER LAMPS

MIL-indicates an engine emission control system fault
Check Engine-indicates engine fault

Check Trans-indicates transmission fault
High Transmission Temperature-indicates excessive transmission oil temperature
ABS-indicates anti-lock brake system fault
HEST-indicates a high exhaust system temperature
Water in Fuel-indicates presence of water in fuel filter
*DPF-indicates a restriction of the diesel particulate filter
*Regen Inhibit-indicates regeneration has been postponed due to user interaction
Range Inhibit-indicates a transmission operation is prevented and requested shift request may not occur.
*SRS-indicates a problem in the supplemental restraint system
Check Message-Turn Signal On
Check Message-Door Ajar
Check Message-Cab Ajar
*Check Message-ESC Active
*Check Message-DPF Regen Active
Check Message-No Engine Data
Check Message-No Transmission Data
Check Message-No ABS Data
Check Message-No Data All Communication With The Vehicle Systems Has Been Lost
Check Message-Check Engine Oil Level
Check Message-Check Washer Fluid Level
Check Message-Check Power Steering Fluid Level
Check Message-Low Transmission Fluid Level
Check Message-Check Coolant Level

GREEN LAMPS

Left and Right turn signal indicators
*ATC-indicates low wheel traction for automatic traction control equipped vehicles, also indicates mud/snow mode is active for ATC system
High Idle-indicates engine high idle is active.
Cruise Control-indicates cruise control is active
OK to Pump-indicates the pump engage conditions have been met
Pump Engaged-indicates the pump is currently in use
Auxiliary Brake-indicates secondary braking device is active

BLUE LAMP

High Beam Indicator

WHITE LAMP

Wait to Start-indicates active engine air preheat cycle

AUDIBLE ALARMS FROM GAUGE PACKAGE

High Trans Temp
High or Low Voltage
Check Engine
Check Transmission
Stop Engine

Low Air Pressure
Fuel Low
Water in Fuel
*ESC
High Coolant Temperature
Low Engine Oil Pressure
Low Coolant Level
*Low DEF Level
Air Filter Restricted
Extended Left and Right Turn Remaining On
Cab Ajar
Door Ajar
ABS System Fault
Seatbelt Indicator

EXTERNAL AUDIBLE ALARM

Air Filter
Cab Ajar
Door Ajar
Check Engine
Stop Engine
Low Air Pressure
Low Engine Oil Pressure
Water in Fuel
*Low DEF
ABS System Fault
Seatbelt Indicator
*Items marked with an asterisk are provided only in applicable configurations.

LCD MESSAGES

Transmission Temperature
Battery Voltage
Engine Hours
Vehicle Speed
Engine RPMs
Fuel Level
DEF Level
Engine Oil Pressure
Ammeter (If equipped)
Auxiliary Ammeter (If equipped)
Engine Coolant Temp
Primary System Air Pressure
Secondary System Air Pressure
Turbo Boost Pressure
Exhaust Temperature
Engine Load
Engine Torque

Instant Fuel Economy
Average Fuel Economy

BACKLIGHTING COLOR

The instrumentation gauges and the switch panel legends shall be backlit using red LED backlighting.

CAMERA

An Audiovox Voyager heavy duty rearview camera system, complete with an LCD display monitor, shall be supplied. One (1) box shaped camera shall be shipped loose for OEM installation in the body to afford the driver a clear view to the rear of the vehicle.

The camera shall be wired to a 7.00 inch flip down monitor which shall include a color display and day and night brightness modes installed above the driver position. The rear camera display shall activate when the vehicle's transmission is placed in reverse.

The camera system shall include a one-way communication device that shall be an integral part of the rear camera for the use of voice commands directly to the driver.

CAB EXTERIOR PROTECTION

The cab face shall have a removable plastic film installed over the painted surfaces to protect the paint finish during transport to the body manufacturer.

FIRE EXTINGUISHER

A 2.50 pound D.O.T approved fire extinguisher with BC rating shall be shipped loose with the cab.

ROAD SAFETY KIT

The cab and chassis shall include one (1) emergency road safety triangle kit.

DOOR KEYS

The cab and chassis shall include a total of four (4) door keys for the manual door locks.

LABELING LANGUAGE

The apparatus shall include the applicable caution, warning, and safety notice labels with text to be written in English.

CHASSIS OPERATION MANUAL

There shall be two (2) digital copies of the chassis operation manual provided with the chassis. The digital data shall include a parts list specific to the chassis model.

ENGINE AND TRANSMISSION OPERATION MANUALS

The following manuals specific to the engine and transmission models ordered will be included with the chassis in the ship loose items:

(1) Hard copy of the Engine Operation and Maintenance manual with CD

(1) Digital copy of the Transmission Operator's manual

(1) Digital copy of the Engine Owner's manual

CAB/CHASSIS AS BUILT WIRING DIAGRAMS

The cab and chassis shall include two (2) digital copies of wiring schematics and option wiring diagrams.

DRIVELINE LAYOUT CONFIRMATION

During the design phase of the chassis the Spartan Chassis driveline engineer shall submit the driveline layout to an OEM engineer to review the chassis design for any potential problems integrating the OEM body to the chassis. The OEM engineer shall provide approval to the driveline engineer prior to driveline bills of materials being released.

MUD FLAPS

In addition to the chassis supplied front mud flaps, there shall be two (2) mud flaps provided rearward of the rear axles on the apparatus. The mud flaps shall be a minimum of 3/8" thick to prevent "sailing."

FRONT BUMPER OVERLAY

There shall be an aluminum anti-slip tread plate overlay installed on the top surface of the front bumper.

FRONT BUMPER STORAGE

There shall be a storage well in the center of the extended front bumper. The storage well shall be located between the chassis frame rails. The floor shall be covered with Dri-Dek. The center hose well shall be used for the storage of the department's E-draulic rescue tools: One (1) Spreader, One(1) Cutter, and One (1) Ram. Tools shall be arranged and or configured in such a manner that each individual tool shall be easily removed from the storage well without having to move another tool for access. Designs that require the movement of one tool in order to access another tool will not be considered.

There shall be a storage well on the right side of the extended front bumper. The floor shall be covered with Turtle Tile™.

The right side hose well shall have the capacity to hold 100' of 1-3/4" pre-connected hose.

There shall be an aluminum tread plate cover installed on the storage well. The cover shall be the full length of the bumper and include two (2) gas cylinders to hold it in the open position. A handle shall be installed on the center of the cover, with a rubber hold down on each side.

The full-width storage well shall utilize Turtle Tile Plastics interlocking squares. Each square shall be made from polyvinyl chloride that is flame and chemical resistant. For maximum slip resistance and drainage, each square shall have a grid surface design.

BATTERY CHARGER

The 120 volt battery charger shall be chassis supplied and installed by the apparatus manufacturer.

STREAMLIGHT RECHARGEABLE LED FIRE VULCANS

There shall be four (4) Streamlight, model 44451, high intensity rechargeable LED Fire Vulcans® supplied and installed on the apparatus. Each Vulcan shall feature C4® LED technology with a 50,000 hour lifetime and shall include two (2) bright blue LED taillights, utilizing blinking and steady modes. Each Vulcan shall be orange in color, include one
(1) Vehicle Mount System (with quick-release strap), and shall be wired directly to the chassis batteries.

12V ACCESSORY OUTLET

There shall be one (1) 12-volt accessory outlet provided. The outlet shall consist of one (1) hot and one (1) ground 14-gauge wire run from the batteries to the specified location. The outlet shall be battery direct and have a minimum of a 20-amp fuse provided with the power circuit. The outlet hall be located in the right EMS Compartment

EMS COMPARTMENT - LEFT

There shall be one (1) EMS compartment installed in the chassis cab, behind the drivers seat. The compartment shall be 32" tall, 22" wide, and 20" deep. The compartment shall be constructed of aluminum. There shall be one (1) adjustable shelf provided inside the compartment. The compartment shall have a vertically hinged door provided on the front for easy access to equipment stored inside. The door shall have a locking "D" ring handle and be hinged on the inside edge of the compartment. The EMS compartment shall be furnished with an LED compartment light mounted on the front corner of the compartment. An automatic door switch shall activate the compartment light. The component shall be painted with a gray Zolatone™ finish to match the interior of the chassis cab.

EMS COMPARTMENT - RIGHT

EMS Compartment, Rear Facing, Behind Driver's Seat, Style 4, 32" H x 20" W x 20" D, Left-Hinged Zolatone Door/Lighting, Locking D-ring handle, 1 Shelf

There shall be one (1) EMS compartment installed in the chassis cab, behind the drivers seat. The compartment shall be 32" tall, 22" wide, and 20" deep. The compartment shall be constructed of aluminum. There shall be one (1) adjustable shelf provided inside the compartment. The compartment shall have a vertically hinged door provided on the front for easy access to equipment stored inside. The door shall have a locking "D" ring handle and be hinged on the inside edge of the compartment. The EMS compartment shall be furnished with an LED compartment light mounted on the front corner of the compartment. An automatic door switch shall activate the compartment light. The component shall be painted with a gray Zolatone™ finish to match the interior of the chassis cab.

ENGINE TUNNEL ALUMINUM SHELF

There shall be one (1) aluminum Line-X® shelf installed on the rear of the engine tunnel. The shelf shall have a mounting surface of approximately 6”.

120V RECEPTACLE OUTLET BAR

There shall be one (1) 120 volt receptacle outlet bar installed on the apparatus. The outlet bar shall have six (6) 120 volt receptacles and wired directly to the shoreline.

The outlet shall be located on the back of the engine tunnel, inside the chassis cab.

WATER TANK

The apparatus shall be equipped with a United Plastic Fabricating 1000 U.S. gallon water tank. Certification of the tank capacity shall be recorded on the manufacturer's record of construction and shall be provided to the purchaser upon delivery of the apparatus. The UPF® water tank shall be constructed of 1/2" thick PT2E™ polypropylene sheet stock. This material shall be a non-corrosive stress relieved thermoplastic, black in color, and U.V. stabilized for maximum protection.

BOOSTER TANK

The booster tank shall be of a specific configuration and shall be so designed to be completely independent of the body and compartments. All joints and seams shall be nitrogen welded and tested for maximum strength and integrity. The top of the booster tank shall be fitted with removable lifting eyes designed with a 3 to 1 safety factor to facilitate easy removal.

TANK BAFFLES

The transverse swash partitions shall be manufactured of 3/8" PT2E™ polypropylene (natural in color) and extend from approximately 4" off the floor to just under the cover. The longitudinal swash partitions shall be constructed of 3/8" PT2E polypropylene (natural in color) and extend to the floor of the tank through the cover to allow for positive welding and maximum integrity. All partitions shall be equipped with vent and air holes to permit movement of air and water between compartments. The partitions shall be designed to provide maximum water flow. All swash partitions shall interlock with one another and be welded to each other as well as to the walls of the tank.

TANK SUMP

There shall be one (1) sump in the bottom of the water tank. The sump shall be constructed of 1/2" polypropylene and shall be located in the left front quarter of the tank. On all tanks that require a front suction, a 4" 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 be used as a combination clean-out and drain. All tanks shall have an anti-swirl plate located approximately 2" above the sump to pre-vent air from being entrained in the water while pumping.

TANK FILL CONNECTION

All tank fill couplings shall be backed with flow deflectors to break up the stream of water entering the tank, and shall be capable of withstanding sustained fill rates of up to 1,000 GPM.

TANK LID

The tank lid shall be constructed of 1/2" thick PT2E™ polypropylene to incorporate a multi three-piece locking design that allows for individual removal and inspection if necessary. The tank lid shall be recessed 3/8" from the top of the tank and shall be welded to both sides and longitudinal partitions for maximum integrity. Each one of the lids shall have hold downs consisting of 2" polypropylene dowels spaced a maximum of 30" apart. These dowels shall extend through the covers and shall assist in keeping the covers rigid under fast filling conditions. A minimum of two lifting dowels shall be drilled and tapped 1/2" x 13" to accommodate the lifting eyes.

WATER TANK MOUNTING

The water tank cradle shall be an integral part of the body sub-frame. Please reference the sub-frame section for complete water tank mounting information.

WATER TANK DRAIN

There shall be a 1-1/2" drain valve provided under the sump of the water tank. The valve shall include a locking lever to prevent accidental draining of the water tank.

WATER TANK FILL TOWER

The tank shall have a combination vent and manual fill tower marked "Water Fill." The fill tower shall be constructed of 1/2" PT2E™ polypropylene and shall be a minimum dimension of 8" x 8" at the outer perimeter. The tower shall be located in the left front corner of the tank. The tower shall have a 1/4" thick removable polypropylene screen and a PT2E™ polypropylene hinged-type cover. The fill tower shall be black in color.

WATER TANK LEVEL GAUGE

There shall be one (1) Innovative Controls SL Plus Tank Level Monitor System provided on the pump operator's control panel. The system shall include one (1) electronic display module(s), a stainless steel pressure transducer sender unit, and the necessary wiring with water-tight plug terminations that do not require sealing grease.

The master display module shall show the tank level using 16 super-bright easy-to-see LEDs. Tank level indication shall be achieved by the appropriate illumination of 4 horizontal rows of LEDs, with 4 LEDs per row. Full and near-full levels shall be indicated with the illumination of all 4 rows of LEDs, including the illumination of the top row of 4 green LEDs. Tank levels between ½ and ¾ full shall be indicated with the illumination of the bottom 3 rows of LEDs, including the illumination of the top row of 4 blue LEDs. Tank levels between ¼ and ½ full shall be indicated with the illumination of the bottom 2 rows of LEDs, including the illumination of the top row of 4 amber LEDs. Tank levels between
¼ full and near empty shall be indicated with the illumination of the bottom row of 4 red LEDs only. Tank levels between near empty and empty shall be indicated by flashing the bottom row of 4 red LEDs.

The master display shall have a backlit area above at the top with illuminated water icon and a backlit area at the bottom with illuminated OEM logo.

A wide-angle polycarbonate diffusion lens in front of the LEDs shall produce a 180° viewing angle. The electronic display module shall be waterproof and shock resistant being encapsulated in a urethane-based potting compound. The potted display electronics shall be integral to a chrome-plated panel-mount reflector that is secured to the apparatus panel with 4 screws installed from the inside of the panel.

All programming functions shall be accessed and performed from the front of the installed master display module with a magnet. The programming shall include manual or self-calibration for any style tank.

WATER TANK LEVEL DISPLAY

The installed SL Plus system shall include two (2) IC SL Plus Monster Light slave displays. There shall be one (1) display mounted on the left side of the chassis cab and one (1) mounted on the right side of the chassis cab. Each monster light shall have 64 super-bright LEDs in 4 discrete groupings of 16 LEDs per color. These colored LED groupings shall mimic the functionality of the master display. The monster light shall not require a separate driver module, having this capability built-in.

4" WATER TANK OVERFLOW

The tank shall be equipped with a minimum of a 4" schedule 40 polypropylene overflow/ air vent pipe. The pipe shall be installed in the fill tower and extend through the tank and dump to the rear of the rear axle.

FOAM CELL

There shall be one (1) United Plastic Fabricating 20 U.S. gallon foam cell incorporated into the water tank. There shall be one (1) pressure/vacuum vent installed on the foam tank. There shall be one (1) drain hose connected to the foam cell. The drain shall have a quarter-turn valve installed inside the pump compartment and it shall drain below the frame rail of the chassis.

Class "A" foam shall be utilized.

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

FOAM TANK LEVEL GAUGE

There shall be one (1) Innovative Controls SL Plus Tank Level Monitor System for indicating Class A foam level provided on the pump operator's control panel. The system shall include one (1) electronic display module, a stainless steel pressure transducer sender unit, and the necessary wiring with water-tight plug terminations that do not require sealing grease.

The master display module shall show the foam tank level using 16 super-bright easy-to- see LEDs. Tank level indication shall be achieved by the appropriate illumination of 4 horizontal rows of LEDs, with 4 LEDs per row. Full and near-full levels shall be indicated with the illumination of all 4 rows of LEDs, including the illumination of the top row of 4 green LEDs. Tank levels between ½ and ¾ full shall be indicated with the illumination of the bottom 3 rows of LEDs, including the illumination of the top row of 4 blue LEDs. Tank levels between ¼ and ½ full shall be indicated with the illumination of the bottom 2 rows of LEDs, including the illumination of the top row of 4 amber LEDs. Tank levels between ¼ full and near empty shall be indicated with the illumination of the bottom row of 4 red LEDs only. Tank levels between near empty and empty shall be indicated by flashing the bottom row of 4 red LEDs.

The master display shall have a backlit area above at the top with illuminated foam A icon and a backlit area at the bottom with illuminated OEM logo.

A wide-angle polycarbonate diffusion lens in front of the LEDs shall produce a 180° viewing angle. The electronic display module shall be waterproof and shock resistant being encapsulated in a urethane-based potting compound. The potted display electronics shall be integral to a chrome-plated panel-mount reflector that is secured to the apparatus panel with 4 screws installed from the inside of the panel.

All programming functions shall be accessed and performed from the front of the installed master display module with a magnet. The programming shall include manual or self-calibration for any style tank.

HOSE BED

The hose bed shall be located above the water tank and have a minimum capacity of 30 cubic feet in accordance with the latest NFPA regulations. The inside of the hose bed shall be smooth aluminum. The hose bed shall exit at the rear of the apparatus through a single access opening. The opening shall be free of obstructions that might interfere with the deployment and loading of hose. There shall be a 1" stainless steel trim piece on the body, at the rear-bottom of the hose bed, to protect the chevron when deploying hose and shall be attached using fasteners.

The interior of the hose bed shall be painted the same body color as the upper portion of the body.

The floor of the hose bed compartment shall be constructed of Dura-Dek fiber reinforced plastic material. The flooring shall be fabricated of "T" beam protrusions in parallel connected with cross slats that are first mechanically bonded and then epoxied, forming a large sheet. The top portion of each "T" cross section shall measure 1-1/4" wide and 3/16" thick with beaded ends. The vertical portion shall be 3/8" thick, beading out at the bottom to a thickness of 1/2" and tall enough to result in an overall height of 1". The "T" sections shall be spaced 3/4" apart to allow for drainage and ventilation.

Each "T" beam shall be constructed utilizing a core of 250,000 continuous glass fiber strands that are high in resistance to tension, compression and bending. An outer sheath consisting of a continuous strand mat to prevent lineal splitting and slipping shall surround the core. The sheath shall also serve to draw the protective resin to the bar surface. Both reinforcements shall be pulled through an isophthalic polyester resin, treated with antimony trioxide for fire resistance, to form a solid length.

The flooring shall then be protected with a polyurethane coating to screen out ultraviolet rays. This bright white coating shall be baked on and shall provide a pleasing contrast when installed in the apparatus. The floor of the hose bed shall be 72 inches from the ground

The hose bed shall be contain the following hose

load: 300' of 2-1/2" double jacket hose

1300' of 5" rubber hose

400' of 2-1/2" double jacket hose

HOSE BED COVER

There shall be a heavy-duty 22 oz. hypalon vinyl-coated nylon hose bed cover installed on the apparatus. The front edge of the cover shall be retained in a "C" channel to prevent wind from lifting it. The sides of the cover shall be attached to the sides of the hose bed using button snap fasteners. The rear of the cover shall be connected using footman loop and J-Hooks with an adjustable buckle. The cover color shall be red.

HOSE BED DIVIDERS

There shall be two (2) hose bed dividers installed in the hose bed. The dividers shall be fabricated from 1/4" smooth aluminum plate and an aluminum extrusion. Each divider shall have an abraded finish and mounted on hot-dipped galvanized slide rails at the front and rear of the hose bed. Where no obstruction such as a fill tower is present, the slide rails shall allow full movement of the dividers along the width of the hose bed. Each hose bed divider shall have an oval shaped hand hold slot to assist in moving the divider. This shall provide the capability for variable hose load configurations and capacities.

BACKBOARD STORAGE

A storage compartment shall be provided on the right side of the hose bed to store two (2) backboards. The compartment shall be equipped with a hinged, brushed stainless steel door with a compression latch to insure that the backboard stored within stays secure.

ALUMINUM BODY CONSTRUCTION

The apparatus body shall be fabricated from 1/8" 5052-H32, smooth aluminum sheet. The total outside width of the apparatus body shall not exceed 100 inches (2.54 meters). The width measurement of the sidewalls shall be made from the outside wall of the two opposite sides of the body. The body shall be designed for a single axle chassis.

The complete apparatus body shall be fabricated utilizing the break and bend techniques in order to form a strong, yet flexible, uni-body structure. The body shall be constructed with holding fixtures to ensure proper dimensioning. Each apparatus body is specific in design in order to meet the unique requirements of the purchasing fire department.

The main body compartments on each side, as well as the rear center compartment if applicable, shall contain a sweep out floor design. Each compartment shall be made to the most practical dimensions in order to provide maximum storage capacity for the fire department's equipment. The door opening threshold shall be positioned lower than the compartment floor permitting easy cleaning of the compartments.

Continuous, solid welded seams shall be located at the upper front and upper rear corners of the apparatus body. The flooring of all lower, main body compartmentation shall also have solid weld seams. Compartment floor/compartment wall corners shall be a continuous, solid weld. All door jams, on both the top and the bottom, shall be solid welded as well. Each main door jam shall consist of a double jam design; this is comparable to a double struck frame design, which provides superior strength and durability. All double door jams are to be welded together utilizing the plug weld technique. All remaining compartment walls shall be stitch welded.

The compartment floors, specifically L1 and R1, shall have a minimum of two (2) 2" x 1/4" angles welded to the entire width of the compartment floor. The two (2) rear side compartments as well as the rear center compartment, if applicable, shall be welded to the rear deck support structure. This rear deck support structure is specially designed for the galvanized apparatus body substructure. A minimum of two (2) angles, which are 1/4" x 3" x 3", shall run the entire width of the body from sidewall to sidewall. Each lower, rear compartment shall be adequately stitch welded to the cross angles providing strength and durability to the entire apparatus body.

The body design shall include a "false wall" design in the lower portion of each lower, rear compartment. This "false wall" is required in order to allow for easy accessibility to the rear electrical components found in the rear tail light cluster area.

On the upper area of the apparatus body, directly above the side compartment door openings, a header is to be fabricated from smooth, aluminum sheet. This area shall be free from any body seams and shall be painted the same color as the apparatus body. The height of the header may vary depending on the following factors: apparatus design, lettering requirements, scene lights and warning light requirements as well as various other options. A "J" channel shall be incorporated into the body design in order

to provide a rain gutter to further assist in preventing excessive moisture from getting into the compartments.

There shall be one (1) Amdor rollup door installed on each side body compartment face. Each door shall have a double wall slat with continuous ball and socket type hinge joints for superior strength and durability. The back surface of each door shall be smooth and flat to eliminate hang-up on compartment contents. The narrow slat design shall allow for a compact balancer and minimum coil size. Each door shall have a satin finish. Each Amdor rollup door shall have a full width stainless steel lift bar latching system. The stiffer mechanism shall allow for one handed release.

The door handles on the side body compartments of the apparatus shall be non-locking style.

There shall be one (1) drip pan with drain provided in the upper section of the compartment that contains the load center. The drip pan shall prevent moisture from the roll-up door spool from entering the compartment interior.

REAR COMPARTMENT DOOR

There shall be one (1) Amdor rollup door installed on the T1 compartment face. The door shall have a double wall slat with continuous ball and socket type hinge joints for superior strength and durability. The back surface of the door shall be smooth and flat to eliminate hang-up on compartment contents. The narrow slat design shall allow for a compact balancer and minimum coil size. The door shall have a satin finish.

The Amdor rollup door shall have a full width stainless steel lift bar latching system. The stiffer mechanism shall allow for one handed release.

BODY COMPARTMENT LIGHTING

There shall be a total of fourteen (14) On-Scene Access Series LED compartment lights installed in the body compartments. Each light shall be enclosed within a tough waterproof Lexan tube enclosure and offer 400 lumens per 18" of light and an adjustable beam angle.

COMPARTMENT COATING

The interior of the body compartments shall be coated with gray Line-X®. thermoplastic polyurethane coating, unless otherwise specified. The coating shall be durable enough to withstand every day abuse of equipment removal and shifting.

COMPARTMENT TILES

There shall be Turtle Tile Plastics interlocking squares in all of the body compartments. The Turtle Tiles shall be applied in all body compartment shelves, adjustable-height trays, floor-mounted trays, and on compartment floors that do not contain floor-mounted trays. No Turtle Tiles shall be applied on compartment floors underneath

floor-mounted trays. Each square shall be made from polyvinyl chloride that is flame and chemical resistant. For maximum slip resistance and drainage, each square shall have a grid surface design.

COMPARTMENT AIR RELEASE

Each compartment shall be vented to help remove trapped air when closing a compartment door. The vent shall be a rubber gasket in the area of the outboard corners of the compartment. Wiring may also be run through these areas.

COMPARTMENT DRAIN HOLES

Each body compartment shall be equipped with drain holes to allow standing water to exit to underneath the apparatus.

HANDRAILS

All handrails, unless otherwise stated, shall be constructed of knurled aluminum of not less than 1-1/4" in diameter. All railing shields and brackets shall be chrome plated, and shall be bolted to the body with stainless steel bolts. The lower bracket on all vertical handrails shall have a drain hole drilled in it at the lowest point.

The following handrails shall be provided on the apparatus:

Top of body – Left Front
Top of body – Right Front
Rear of body- Left of hose bed
Rear of body- Right of hose bed
Rear of body- Below hose bed

FUEL FILL

The fuel fill pocket shall be located in the driver's side rear wheel well area. The fuel fill shall utilize a stainless steel OEM door with a polished finish. The hinge and frame shall all be constructed out of stainless steel material.

DRIVER'S (LEFT) SIDE BODY COMPARTMENTS

COMPARTMENT L1

There shall be a full height compartment located ahead of the rear wheels on the driver's side of the apparatus body. This compartment shall be designated as L1 within these specifications and any ensuing paperwork or drawings after contract execution.

The dimensions of the compartment shall be:
Height: 58"
Width: 42"
Depth: 15" Upper and 26" Lower
Intermediate Divide Height: 27"

L1 Components:

There shall be one (1) aluminum adjustable shallow-depth shelf installed on the apparatus in the compartment. The shelf shall be constructed of 3/16" aluminum sheet with 2" lips. The shelf shall have a abraded finish and shall be designed in such a manner as to allow liquids to readily drain when spilled.

There shall be one (1) roll out equipment tray installed on the floor of the compartment. The tray shall be equipped with an Austin Hardware drawer slide. The roller assembly shall have a rated capacity of 300 lbs. distributed load and shall have 100% extension capability. The tray shall be constructed of 3/16" aluminum sheet with 3" lips to prevent items from being shifted during transportation. The tray shall have an abraded finish and be equipped with a gas spring in order to hold the tray in either a fully extended or closed position.

There shall be one (1) aluminum mounting plate installed on the back wall of the compartment. The plate shall be spaced away from the back wall of the compartment with uni-strut channels, which shall also be used as an easy means of removing the plate to mount equipment brackets. The plate shall be constructed of 3/16", 5052-H32 aluminum and have an abraded finish.

There shall be aluminum vertical strut channels welded in the compartment. There shall be two (2) struts on each side of the compartment
The compartment layout shall be detailed at
the pre-construction meeting.

COMPARTMENT L2

There shall be a standard height compartment located above the rear wheels on the driver's side of the apparatus body. This compartment shall be designated as L2 within these specifications and any ensuing paperwork or drawings after contract execution.

The dimensions of the compartment shall be:
Height: 25.5"
Width: 65"
Depth: 15"

L2 Components:

There shall be one (1) aluminum mounting plate installed on the back wall of the compartment. The plate shall be spaced away from the back wall of the compartment with uni-strut channels, which shall also be used as an easy means of removing the plate to mount equipment brackets. The plate shall be constructed of 3/16", 5052-H32 aluminum and have an abraded finish.

There shall be aluminum vertical strut channels welded in the compartment. There shall be two (2) struts on each side of the compartment
The compartment layout shall be detailed at
the pre-construction meeting.

COMPARTMENT L3

There shall be a full height compartment located behind the rear wheels on the driver's side of the apparatus body. This compartment shall be designated as L3 within these specifications and any ensuing paperwork or drawings after contract execution.

The dimensions of the compartment shall be:
Height: 58"
Width: 48"
Depth: 15" Upper and 98" Lower
Intermediate Divide Height: 27"

L3 Components:

There shall be one (1) roll out equipment tray installed on the floor of the compartment. The tray shall be equipped with an Austin Hardware drawer slide. The roller assembly shall have a rated capacity of 300 lbs. distributed load and shall have 100% extension capability. The tray shall be constructed of 3/16" aluminum sheet with 3" lips to prevent items from being shifted during transportation. The tray shall have an abraded finish and be equipped with a gas spring in order to hold the tray in either a fully extended or closed position.

There shall be one (1) aluminum mounting plate installed on the back wall of the compartment. The plate shall be spaced away from the back wall of the compartment with uni-strut channels, which shall also be used as an easy means of removing the plate to mount equipment brackets. The plate shall be constructed of 3/16", 5052-H32 aluminum and have an abraded finish.

There shall be aluminum vertical strut channels welded in the compartment. There shall be two (2) struts on each side of the compartment

The compartment layout shall be detailed at the pre-construction meeting.

DRIVER'S SIDE REAR WHEEL WELL POSITION - WL1 FORWARD

There shall be a three (3) air bottle compartment installed in the forward portion of the rear wheel well area, on the driver's side. The compartment shall be a vertical design. The compartment door and hinges shall be constructed out of stainless steel material, and the frame shall be constructed out of aluminum. The door shall have a rubber gasket in order to create a 100% seal to protect the interior of the compartment. The storage compartment shall be a rotational, molded component that is assembled to the door and frame. This assembly process shall prevent the air bottle from making contact with the stainless steel frame while loading and unloading the air bottle. The door shall have a brushed stainless steel finish.

DRIVER'S SIDE REAR WHEEL WELL POSITION - WL3 REARWARD

There shall be a single air bottle compartment installed in the rearward portion of the rear wheel well area, on the driver's side. The compartment door and hinges shall be constructed out of stainless steel material, and the frame shall be constructed out of aluminum. The door shall have a rubber gasket in order to create a 100% seal to protect the interior of the compartment. The storage compartment shall be a rotational, molded component that is assembled to the door and frame. This assembly process shall prevent the air bottle from making contact with the stainless steel frame while loading and unloading the air bottle. The door shall have a brushed stainless steel finish.

OFFICER'S (RIGHT) SIDE BODY COMPARTMENTS

COMPARTMENT R1
There shall be a full height compartment located ahead of the rear wheels on the officer's side of the apparatus body. This compartment shall be designated as R1 within these specifications and any ensuing paperwork or drawings after contract execution.

The dimensions of the compartment shall be:
Height: 58"
Width: 42"
Depth: 15" Upper and 26" Lower
Intermediate Divide Height: 27"

R1 Components:

There shall be one (1) aluminum adjustable shallow-depth shelf installed on the apparatus in the compartment. The shelf shall be constructed of 3/16" aluminum sheet with 2" lips. The shelf shall have a abraded finish and shall be designed in such a manner as to allow liquids to readily drain when spilled.

There shall be one (1) roll out equipment tray installed on the floor of the compartment. The tray shall be equipped with an Austin Hardware drawer slide. The roller assembly shall have a rated capacity of 300 lbs. distributed load and shall have 100% extension capability. The tray shall be constructed of 3/16" aluminum sheet with 3" lips to prevent items from being shifted during transportation. The tray shall have an abraded finish and be equipped with a gas spring in order to hold the tray in either a fully extended or closed position.

There shall be one (1) aluminum mounting plate installed on the back wall of the compartment. The plate shall be spaced away from the back wall of the compartment

with uni-strut channels, which shall also be used as an easy means of removing the plate to mount equipment brackets. The plate shall be constructed of 3/16", 5052-H32 aluminum and have an abraded finish.

There shall be aluminum vertical strut channels welded in the compartment. There shall be two (2) struts on each side of the compartment
The compartment layout shall be detailed at
the pre-construction meeting.

COMPARTMENT R2

There shall be a standard height compartment located above the rear wheels on the officer's side of the apparatus body. This compartment shall be designated as R2 within these specifications and any ensuing paperwork or drawings after contract execution.

The dimensions of the compartment shall be:
Height: 25.5"
Width: 65"
Depth: 15"

R2 Components:

There shall be one (1) aluminum mounting plate installed on the back wall of the compartment. The plate shall be spaced away from the back wall of the compartment with uni-strut channels, which shall also be used as an easy means of removing the plate to mount equipment brackets. The plate shall be constructed of 3/16", 5052-H32 aluminum and have an abraded finish.

There shall be aluminum vertical strut channels welded in the compartment. There shall be two (2) struts on each side of the compartment
The compartment layout shall be detailed at
the pre-construction meeting.

COMPARTMENT R3

There shall be a full height compartment located behind the rear wheels on the officer's side of the apparatus body. This compartment shall be designated as R3 within these specifications and any ensuing paperwork or drawings after contract execution.

The dimensions of the compartment shall be:
Height: 58"
Width: 40"
Depth: 15" Upper and 98" Lower
Intermediate Divide Height: 27"

R3 Components:

There shall be one (1) roll out equipment tray installed on the floor of the compartment. The tray shall be equipped with an Austin Hardware drawer slide. The roller assembly shall have a rated capacity of 300 lbs. distributed load and shall have 100% extension capability. The tray shall be constructed of 3/16" aluminum sheet with 3" lips to prevent items from being shifted during transportation. The tray shall have an abraded finish and be equipped with a gas spring in order to hold the tray in either a fully extended or closed position.

There shall be one (1) aluminum mounting plate installed on the back wall of the compartment. The plate shall be spaced away from the back wall of the compartment with uni-strut channels, which shall also be used as an easy means of removing the plate to mount equipment brackets. The plate shall be constructed of 3/16", 5052-H32 aluminum and have an abraded finish.

There shall be aluminum vertical strut channels welded in the compartment. There shall be two (2) struts on each side of the compartment

The compartment layout shall be detailed at the pre-construction meeting.

OFFICER'S SIDE REAR WHEEL WELL POSITION – FORWARD

There shall be a two (2) fire extinguisher compartment installed in the rear wheel well area. The compartment shall be a vertical design, and the door shall have a triangular design. The triangular compartment door, hinges and frame shall all be constructed out of stainless steel material. The door shall have a rubber gasket in order to create a 100% seal to protect the interior of the compartment. The door shall have a brushed stainless steel finish. The compartment shall be capable of storing two 2-1/2 gallon water extinguishers.

OFFICER'S SIDE REAR WHEEL WELL POSITION - REARWARD

There shall be a single extinguisher/water can compartment installed in the rearward portion of the rear wheel well area, on the officer's side. The compartment shall be large enough to hold extinguisher/water can up to 9" in diameter, with sufficient space for the discharge tube. The compartment door and hinges shall be constructed out of stainless steel material, and the frame shall be constructed out of aluminum. The door shall have a rubber gasket in order to create a 100% seal to protect the interior of the compartment. The storage compartment shall be a rotational, aluminum component that is assembled to the door and frame. This assembly process shall prevent the air bottle from making contact with the stainless steel frame while loading and unloading the air bottle. The door shall have a brushed stainless steel finish. The compartment shall be capable of storing one ABC extinguisher.

REAR BODY COMPARTMENTS

COMPARTMENT T1

There shall be a full height compartment located at the rear of the apparatus body. This compartment shall be designated as T1 within these specifications and any ensuing paperwork or drawings after contract execution.

The dimensions of the compartment shall be:
Height: 26"
Width: 41"
Depth:34 "

T1 Components:

There shall be one (1) roll out equipment tray installed on the floor of the compartment. The tray shall be equipped with an Austin Hardware drawer slide. The roller assembly shall have a rated capacity of 300 lbs. distributed load and shall have 100% extension capability. The tray shall be constructed of 3/16" aluminum sheet with 3" lips to prevent items from being shifted during transportation. The tray shall be equipped with the Austin Hardware front drawer release system, which allows for one handed latch closed position release. The tray shall have an abraded finish and shall be equipped with a locking slide in order to hold the tray in either a fully extended or closed position.

There shall be aluminum vertical strut channels welded in the compartment. There shall be two (2) struts on each side of the compartment

The compartment layout shall be detailed at the pre-construction

meeting. <u>GS-36 BODY SUB FRAME</u>

To assure proper body alignment and clearance, the body sub frame shall be constructed in a jig and fitted directly on the chassis. The sub frame shall be constructed of 36,000 PSI galvanized steel.

The chassis frame rails shall be fitted with fiber reinforced rubber to isolate the body frame members from direct contact with chassis frame rails.

The main body sub frame shall be constructed from steel tubing. The sub frame shall run the full length of the body and shall be spaced the same width as the chassis frame rails. The main sub frame shall also be the integral support for the water tank. Vertical drop tubes shall be welded to the sub frame. From these vertical drop tubes shall extend cross members constructed of steel angle. These cross members shall extend out to support the compartments. Cross members shall be located at the front and rear of the body and in front and rear of the wheel well opening.

A drop frame, fabricated of steel tube and steel angles, shall support the compartment area behind the rear. The rear drop frame shall be constructed using vertical drop tubes, welded to the main sub frame. All drop frame structures shall be welded directly

to the body sub frame to allow the body to be a completely separate structure from the chassis.

After fabrication the sub frame shall be hot dip galvanized for maximum protection against corrosion.

BODY MOUNTING

The body sub frame shall be fastened to the chassis frame with a minimum of six (6) spring loaded body mounts. Each mount shall be configured using a two-piece bracket. The two (2) brackets shall be fabricated of steel plates. The plates shall be galvanized to prevent any corrosion. Each mounting assembly shall utilizing two (2) plated bolts and two (2) heavy duty springs. The assembly design shall allow the body and sub frame to act as one (1) component, separate from the chassis. As the chassis frame twists under driving conditions, the spring mounting system shall limit any stress from being transferred into the body. The spring loaded body mounts shall also prevent frame side rail or body damage caused by unevenly distributed stress and strains due to load and chassis movement.

Body mountings that do not allow relief from chassis movement shall not be acceptable.

TANK MOUNTING

The water tank shall rest on the sub frame cross members which are spaced as required by the tank manufacturer.

The tank shall be isolated from the cross members through the use of hard rubber strips with a minimum Rockwell hardness of 60 durometer. Additionally, the tank shall be supported around the entire perimeter and captured front and rear as well as side to side to prevent the tank from shifting during vehicle operations.

Although the tank shall be designed on a free floating suspension principle, it shall be required that the tank have adequate hold down restrains to minimize movement during vehicle operations.

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

WALKWAYS AND OVERLAYS

All exterior surfaces designated by the manufacturer as stepping, standing, or walking areas shall be overlaid with 3003 H22 Bright Tread Plate to provide a slip resistant surface, even when the surface is wet. All interior surfaces designated by the manufacturer as stepping, standing, or walking areas shall be slip resistant when the surface is dry. The degree of slip resistance shall be in compliance with the intent of NFPA 1901.

Horizontal walkways shall have .080" aluminum tread plate overlays installed and vertical surfaces shall have .125” aluminum overlays. Overlays shall be installed that are

totally insulated from the apparatus with nylon shoulder washers that extend into holes in the body. Stainless steel cap nuts shall be employed where bolt ends may damage equipment or cause injury. After the apparatus is painted and the overlays are reinstalled, they shall be additionally sealed at the edges with a caulking compound. The exterior top tread plate overlay shall be mounted flush with the outer edges of the apparatus body.

STEPPING SURFACES

All steps shall have a surface area of at least 35 square inches and shall be able to withstand a load of at least 500 pounds. Steps shall be provided at any area that personnel may need to climb and shall be adequately lighted.

GRIP STRUT REAR DECK

A modular bolt-on deck shall be installed on the rear of the apparatus to form a full width step. The rear deck shall be constructed of aluminum Grip Strut® material. The outside edge of the rear deck shall be flush with the rub rail that is installed on the body to maintain a uniform appearance. The depth of the rear deck shall be 13.25". The rear deck shall be installed with sufficient support to form a sturdy, non-deflecting step area for personnel.

BODY RUB RAILS

Rub rails shall be installed beneath the compartment doors to protect them from damage should the body be brushed or rubbed against another object. The rub rails shall be 3/16” aluminum channel, 2-1/2” x 1”. The rub rails shall be highly polished and then bright dip anodized.

The rub rails shall be installed on the body utilizing non-corrosive nylon spacers and secured with stainless steel bolts. The outside edge of the rub rails shall be even with the fenderettes and bolt-on steps to prevent snagging.

REAR UNDERBODY TOW EYES

Two (2) rear tow eyes shall be installed directly below the rear of the chassis frame rails, mounted to the subframe. The tow eyes shall be capable of a combined 15,000 lb. straight pull rating.

REAR WHEEL WELLS

The fenders shall be integral with the body sides and compartments with a seamless appearance. The fenders shall be fitted with bolt-in removable full circular inner liners in the wheel well area for ease of cleaning and maintenance. There shall be sufficient clearance provided in the wheel well to allow the use of tire chains when the apparatus fully loaded.

STAINLESS STEEL REAR FENDERETTES

Two (2) stainless steel fenderettes shall be installed at the outboard edge of the rear wheel well area, one (1) on each side. The fenderettes shall be bolted to the apparatus body using nylon washers to space them slightly away from the body to reduce build-up of road grime. The fenderettes shall be constructed of stainless steel that has been polished to a high quality finish.

EXHAUST HEAT DEFLECTOR SHIELD

There shall be a 4" heat deflector shield installed over the exhaust to aid in dissipating the heat to prevent exhaust heat from adversely affecting anything stored in the body.

FUEL TANK GAUGE ACCESS PANEL

There shall be a removable panel provided in the rear compartment to allow for access to the fuel tank gauge without removing the fuel tank.

LICENSE PLATE BRACKET

There shall be a license plate bracket mounted on the rear of the apparatus. A clear LED light shall be incorporated into the bracket.

FRONT BODY STEPS AND LIGHTING

There shall be three (3) Cast Products folding steps located on the front of the driver's side body compartments. The folding steps shall have two large open slots to prevent the buildup of ice or mud and to provide a handhold when necessary. The steps shall have a surface area of at least 35 square inches and shall be able to withstand a load of 500 pounds.

The steps shall be adequately lit with LED lighting. There shall be one (1) light located above the steps.

There shall be a handrail installed forward on the top of the body, on the driver's side.

FRONT BODY STEPS AND LIGHTING

There shall be three (3) Cast Products folding steps located on the front of the officer's side body compartments. The folding steps shall have two large open slots to prevent the buildup of ice or mud and to provide a handhold when necessary. The steps shall have a surface area of at least 35 square inches and shall be able to withstand a load of 500 pounds.

The steps shall be adequately lit with LED lighting. There shall be one (1) light located above the steps.

There shall be a handrail installed on the top officer's side front of the body.

REAR STEPS

There shall be six (6) Cast Products folding steps installed on the rear of the apparatus. Each folding step shall have two (2) large open slots to prevent buildup of ice or mud and to provide a handhold when necessary. Steps shall be provided in the following locations:

- Four (4) folding steps on the driver's side rear of the apparatus.
- Two (2) folding steps on the officer's side rear of the apparatus.

The steps shall be adequately lit with LED lighting. There shall be one (1) light located above each set of steps on the rear face of the body, for a total of two (2) lights. Each light shall be located in a manner that shall light all of the steps on its respective side.

There shall be two (2) vertical handrails installed on the rear of the apparatus, one (1) on the driver's side and one (1) on the officer's side.

There shall be a horizontal handrail installed below the hose bed.

GROUND LADDER STORAGE

The ground ladders shall be stored beneath the hose bed, on the officer's side of the water tank. The ladders shall be stored vertically on their beam in an aluminum rack with poly scuff strips. The ladders shall be accessible through a hinged painted aluminum door on the rear of the body.

The following ground ladders shall be supplied with the apparatus:

One (1) Duo Safety, model 900-A, 24' two section aluminum extension ladder shall be provided. The ladder shall be constructed with 6061-T6 aluminum alloy and shall have a 750 pound duty rating. The ladder shall have a closed length of 14' 2.75".

One (1) Duo Safety, model 775-A, 14' aluminum roof ladder shall be provided. The ladder shall have a 750 pound duty rating and aluminum roof hooks that fold for storage.

One (1) Duo Safety, model 585-A, 10' folding ladder shall be provided. The ladder shall have a 300 pound duty rating and Duo Safety ladder shoes for slip resistance.

PIKE POLE STORAGE

There shall be four (4) aluminum tubes for the storage of pike poles installed in the ground ladder storage compartment.

The following pike poles shall be supplied with this location on the apparatus:

One (1) Fire Hooks Unlimited, model NHF-6, 6' fiberglass pike pole shall be provided. The pike pole shall be constructed of tubular fiberglass with an ash core for added strength and durability.

One (1) Fire Hooks Unlimited, model NHF-8, 8' fiberglass pike pole shall be provided. The pike pole shall be constructed of tubular fiberglass with an ash core for added strength and durability.

One (1) Fire Hooks Unlimited, model NYFG-10, 10' fiberglass pike pole shall be provided. The pike pole shall be constructed of tubular fiberglass with an ash core for added strength and durability, an iron head, Celtex grips, and a ram rod on the end.

One (1) Fire Hooks Unlimited, model APH-6, 6' fiberglass pike pole with all-purpose hook shall be provided. The pike pole shall be constructed of solid fiberglass with stainless steel wear sleeves, Celtex shock absorbing grip and a gas shut-off with directional slot.

HARD SUCTION HOSE STORAGE

Provisions shall be made to provide storage for two (2) hard suction hoses in the ladder storage compartment.

HARD SUCTION HOSES

There shall be two (2) Firequip Maxi-Flex PVC 6” x 10’ sections of hard suction hose provided.

WHEEL CHOCKS

There shall be one (1) pair of Zico model SAC-44 wheel chocks provided with the apparatus. The wheel chocks shall be mounted in Zico model SQCH-44-H mounting brackets.

The wheel chocks shall be stored in locations that are easily accessible under the front of the body on the driver's side of the apparatus.

INDEPENDENT ALUMINUM SIDE MOUNT PUMP MODULE

The pump module shall be a side mount design. The pump module shall be fabricated from 1/8" 5052-H32, smooth aluminum sheet. The module shall be fabricated as an individual unit, independent from the body. The module shall be fabricated utilizing the break and bend technique in order to form a strong, yet flexible, structure. The pump module shall be fabricated using precision holding fixtures to ensure proper dimensions and all attachment points shall be heavily reinforced.

PUMP COMPARTMENT LIGHTS

The pump compartment shall be equipped with two (2), 9" On-Scene Night Axe LED compartment lights. The lights shall be rated at 100,000 hours of service. The light shall be waterproof and magnesium chloride resistant. The light shall be enclosed in tough 5/8" Lexan tube. Multi-clip attachments shall allow for easy installation.

DRIVER'S SIDE RUNNING BOARD

A modular bolt-on running board shall be installed on the driver's side of the pump module. The running board shall be constructed of anti-slip tread plate. There shall be a floating storage well compartment recessed in the running board. The outside edge of the running board shall be flush with the rub rail that is installed on the body to maintain a uniform appearance. The running board shall be installed with sufficient support to form a sturdy, non-deflecting step area for personnel.

There shall be two (2) PAC, model 1008, straps provided with the storage well. The straps shall be installed over the top of the compartment.

The hose well shall have the capacity to hold 33' of 5" LDH hose with Storz couplings.

The floor of the storage wells shall each be covered with Turtle Tile flooring.

OFFICER'S SIDE RUNNING BOARD

A modular bolt-on running board shall be installed on the officer's side of the pump module. The running board shall be constructed of anti-slip tread plate. There shall be a floating storage well compartment recessed in the running board. The outside edge of the running board shall be flush with the rub rail that is installed on the body to maintain a uniform appearance. The running board shall be installed with sufficient support to form a sturdy, non-deflecting step area for personnel.

There shall be two (2) PAC, model 1008, straps provided with the storage well. The straps shall be installed over the top of the compartment.

The hose well shall have the capacity to hold 33' of 5" LDH hose with Storz couplings.

The floor of the storage wells shall each be covered with Turtle Tile flooring.

FRONT PUMP ACCESS PANEL

There shall be a tread plate access panel provided on the front of the pump compartment. The panel shall be of the single pan design and shall be positively latched in the closed position utilizing a push button latch. An aluminum sill protector shall be installed on the bottom of the door opening to protect the paint from chipping and scratching. This area shall be accessible when the cab is tilted.

OFFICER'S SIDE PUMP ACCESS PANEL

There shall be a stainless steel door above the officer's side pump panel to allow access to the pump module. The vertically hinged panel shall be of the single pan design and shall be positively latched in the closed position utilizing a compression

latch. A gas strut shall be provided on the door. The door shall be wired into the door open warning light circuit.

CONTROL PANEL

The driver's side of the pump enclosure shall be divided into two sections. The lower section shall be where all valve controls, the primer control, the discharge relief valve controls (pilot valve), and other mechanical controls are located. This surface shall be referred to as the "control panel".

All valve controls shall be the self-locking type, activated by either direct control or with a direct linkage utilizing friction locking bell cranks and universal ball swivels. The primary valve handles shall have color coded tags installed in a recessed area to clearly denote the purpose of each control.

INSTRUMENT PANEL

The surface above the control panel shall contain all instruments, gauges, test fittings, and optional controls. This surface shall be referred to as the "instrument panel". The instrument panel shall be independent and hinged and latched so that it may be opened. All instruments, gauges, and other equipment shall be installed with sufficient slack in any cabling, tubing, or plumbing to allow the panel to swivel to the fully open position.

The instrument and gauge panel shall be vertically hinged “swing out” to provide access for service.

OFFICER'S SIDE PUMP PANEL

A single panel shall be installed on the officer's side of the pump enclosure. This shall be the area where any officer's side discharges, inlets, steamers, and other pump associated equipment are located. This panel shall be easily removable and held in place with quick release push latches. It shall be fully removable for pump and plumbing access without the need to use hand tools. Any electrical equipment that may be installed shall be equipped with connectors so they may be easily separated from the opening created when the below described front access panel is removed.

PANEL SURFACES

The control panel, instrument panel, and officer's side pump panel shall be fabricated from a minimum of 16 gauge stainless steel with #4 brushed finish.

GARNISH RING BEZEL ASSEMBLIES

Innovative Controls intake and/or discharge garnish rings shall be installed to the apparatus with mounting bolts. These bezel assemblies shall be used to identify intake and/or discharge ports with color and verbiage. The garnish rings shall be designed and manufactured to withstand the specified apparatus service environment and shall be

backed by a warranty equal to that of the exterior paint and finish. The specified assemblies shall feature a chrome-plated panel-mount bezel with durable UV resistant polycarbonate inserts. These UV resistant polycarbonate graphic inserts shall be sub-surface screen printed to eliminate the possibility of wear and protect the inks from fading. All insert labels shall be backed with 3M permanent adhesive (200MP), which meets UL969 and NFPA standards.

VERBIAGE TAG BEZEL ASSEMBLIES

Innovative Controls verbiage tag bezels shall be installed. The bezel assemblies will be used to identify apparatus components. These tags shall be designed and manufactured to withstand the specified apparatus service environment and shall be backed by a warranty equal to that of the exterior paint and finish. The verbiage tag bezel assemblies shall include a chrome-plated panel-mount bezel with durable easy-to-read UV resistant polycarbonate inserts featuring the specified verbiage and color coding. These UV resistant polycarbonate verbiage and color inserts shall be sub-surface screen printed to eliminate the possibility of wear and protect the inks from fading. Both the insert labels and bezel shall be backed with 3M permanent adhesive (200MP), which meets UL969 and NFPA standards.

SAFETY MESSAGE BEZEL ASSEMBLIES

Innovative Controls safety message bezels shall be installed. The bezel assemblies will be used to identify, instruct, or warn the operators. These tags shall be designed and manufactured to withstand the specified apparatus service environment and shall be backed by a warranty equal to that of the exterior paint and finish. The safety message bezel assemblies shall include a chrome-plated panel-mount bezel with durable easy-to- read UV resistant polycarbonate inserts featuring ANSI safety standard graphics or custom graphics. These UV resistant polycarbonate graphic inserts shall be sub-surface screen printed to eliminate the possibility of wear and protect the inks from fading. Both the graphic insert labels and bezel shall be backed with 3M permanent adhesive (200MP), which meets UL969 and NFPA standards.

PUMP PANEL LIGHTING

The pump operator's control panel and the officer's side pump panel shall each be illuminated by On-Scene LED Night Axe lighting. The pump panel lights shall become energized upon setting the parking brake so the gauge information provided may be consulted at any time the apparatus is parked. A stainless steel shield shall be installed over the pump panel lights to further protect them from the elements and to act as a reflector for additional illumination.

The pump panel lighting shall become energized automatically upon setting the park brake so the gauge information may be consulted at any time the apparatus is parked.

MIDSHIP MOUNT FIRE PUMP

The pump shall be a Waterous CSUC20 1500 U.S. GPM (6000 LPM) fire pump. The pump shall be a single stage centrifugal class "A" rated fire pump, designed specifically for the fire service. The pump shall be rated at 1250 gallons per minute.

The pump body shall be cast as two (2) horizontally split pieces. The body shall be made of high tensile, close-grained gray iron with a minimum tensile strength of 40,000 PSI.

FLAME PLATED IMPELLER HUBS

The pump impellers shall be bronze, specifically designed for the fire service and accurately balanced for vibration free running. The stripping edges shall be located on opposite sides of the impellers to reduce shaft deflection.

The impeller shaft shall be stainless steel, accurately ground to size and supported at each end by oil or grease lubricated anti-friction ball bearings for rigid, precise support. The bearings used on the impeller shaft shall be automotive type bearings, easily cross-referenced and readily available at normal parts or bearing stores.
The impeller hubs shall be flame plated with tungsten carbide to hardness approximately twice that of tool steel to assure maximum pump life and efficiency. During the flame plating process the base metal shall not be allowed to exceed a temperature of 300 degrees Fahrenheit to prevent altering the metallurgical properties of the impeller material.

IMPELLER WEAR RINGS

The pump shall be equipped with replaceable bronze wear rings for increased pump life and minimum maintenance cost. The wear rings shall be designed to fit into a groove in the face of the impeller hubs forming a labyrinth that, as the clearance increases with age, directs water from the discharge side in several directions eventually exiting outward, away from the eye of the impeller hub.

LUBRICATION SYSTEM

An internal lubrication system shall deliver lubricant directly to the drive chain. This unique design shall eliminate the need for an external lubrication pump and auxiliary cooling. Oil shall be supplied with the lubrication system.

PUMP TRANSMISSION

The pump shall have a Waterous model C20 series transmission. The housing of the transmission shall be constructed of high strength, three piece, horizontally split aluminum. The drive line shafts shall be made from alloy steel forgings, hardened and ground to a size 2.350 inch 46 tooth involute spline. The drive and driven sprockets shall be made of steel and shall be hardened and have ground bores. The drive chain shall be a Morse HV™ high strength involute form chain. Bearings shall be deep

groove, anti friction ball bearings and shall give support and proper alignment to the impeller shaft assembly. Bearings shall be oil splash lubricated, completely separated from the water being pumped, and protected by a V-ring and oil seal. An internal lubrication system shall deliver lubricant directly to the drive chain. This unique design eliminates the need for an external lubrication pump and auxiliary cooling. The pump and transmission shall be easily separable. A two-piece shaft shall be splined allowing for individual repair of either the pump or transmission, to keep down time to a minimum. All drive line components shall have a torque rating equal to or greater than the final net engine torque.

PUMP PACKINGS

The stuffing boxes shall be equipped with Waterous Grafoil® two-piece adjustable packing glands.

ZINC ANODES

There shall be four (4) Waterous zinc anodes provided with the fire pump. The anodes shall aid in preventing galvanic corrosion within the water pump and be easily replaceable. The anodes shall be installed as follows:

- Two (2) on the intake side of the pump
- Two (2) in the discharge manifold of the fire pump.

FIRE PUMP MOUNTING

The fire pump shall be mounted within a separate body module that is not directly connected to the apparatus body.

The pump shall be frame mounted; therefore minimizing the likelihood of the pump casing cracking should the apparatus be involved in a collision.

The pump module shall be mounted to the frame in four (4) locations and shall be reinforced appropriately in order to carry the expected load for the life of the apparatus.

PUMP SHIFT

The pump shift actuating mechanism shall be air operated from a valve in the cab identified as "PUMP SHIFT". Full instructions for shifting the pump shall be inscribed on the valve plate.

There shall be two (2) green pump system shift indicator lights in the chassis cab. The first light shall become energized when the pump has completed its shift into pump gear and shall be labeled "Pump Engaged". The second light shall become energized when the chassis parking brake has been set and when the pump and the chassis transmissions have been shifted completely into the correct gears for pumping, this light shall be labeled "OK to Pump".

There shall be one (1) green pump system shift indicator light located on the operator's panel. This light shall only become engaged when the chassis parking brake has been set and when the pump and the chassis transmissions have been completely shifted into the correct gears. The light shall be located adjacent to the throttle control and shall be labeled "Warning: Do Not Open Throttle Unless Light Is On".

MANUAL OVERRIDE

A manual override system shall be supplied for the pump shift should a problem develop in the chassis air brake system. Controls for the override shall be located near the front of the body on the driver's side. Instructions shall be inscribed on a plate near the pump shift controls.

DISCHARGE RELIEF VALVE

The discharge relief valve system shall be positive and quick acting, with an instantaneous hydraulic lockout that does not require the operator to cancel out or disturb the pressure setting. With the pump operating from draft and delivering its rated capacity at 150 PSI, if lines are shut down, the increase in discharge pressure shall not exceed 20 PSI. The relief valve control (pilot valve) shall be protected from malfunction due to sand or other sediment in the water by a strainer that may be removed, cleaned and replaced from the operator's panel while the pump is operating and without shutting down the continuous flow of water.

Relief valve indicator lights shall be mounted on the panel adjacent to the pilot valve assembly. The indicator lights shall be amber, marked open to indicate the relief valve is bypassing and green, marked closed to indicate the relief valve is fully closed.

ENGINE INFORMATION DISPLAY

There shall be one (1) Class 1 ENFO IV Engine Information Display installed on the pump operator's panel. The ENFO IV shall display engine RPM, engine oil pressure, engine coolant temperature, and voltage. The ENFO IV shall use the SAE J-1939 data bus for its information and shall not require any additional sensors to be mounted. An external alarm shall activate when oil pressure is 10 PSI or less, engine temperature is 250° F or higher, or voltage is 11.9V or less. During a low voltage or low oil pressure condition the corresponding display shall alternate between the current value and "LO". During a high temperature condition the engine temp display shall alternate between the temperature and "HI".

VERNIER TYPE HAND THROTTLE

A superior quality, vernier type hand throttle shall be installed on the pump control panel to regulate the fuel supply to the engine driving the fire pump. The throttle shall be equipped with a positive locking, quick-release center.

PUMP HOUR METER

There shall be a pump hour meter provided and installed inside the pump compartment. The hour meter shall be activated only when the water pump has been engaged.

INTAKE RELIEF VALVE

There shall be an Elkhart Brass intake relief valve installed on the suction side of the pump. The valve shall be the preset type, adjustable from 75 to 250 PSI, and shall be designed to prevent vibration from altering the setting. The relief outlet shall be directed below the pump with the discharge terminating in a 2-1/2" male NST connection. The discharge shall be away from the pump operator and labeled "Do Not Cap".

TRIDENT PRIMING PUMP

The priming pump shall be a Trident Emergency Products, model 31.001.7 three barrel, 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. There shall be a pressure protection valve installed with the priming pump. A single panel mounted control shall activate the priming pump and open the priming valve to the pump.

MASTER DRAIN VALVE

A Trident manifold drain valve assembly shall be supplied. This drain shall provide the capability to drain the entire pump by turning a single control. The valve assembly shall consist of a stainless steel plate and shaft in a bronze body with multiple ports. The drain valve control shall be mounted on the driver's side pump panel and labeled "Master Drain".

PAINT PUMP GRAY/PAINT STEAMER AND INLET VALVES PRIMARY BODY COLOR

The pump body shall be painted with PPG polyurethane enamel paint. The paint color shall be a neutral gray. The pump enclosure shall be painted the same color as the apparatus body.

The steamer and partially recessed inlet valves shall be painted with a PPG polyurethane enamel paint. The paint color shall be the same as the apparatus body.

PUMP AND ENGINE COOLING SYSTEM

There shall be a pump and engine cooling system provided on the apparatus. The cooling system shall keep the engine cool when running for long periods of time and the pump cool during long periods of pumping when water is not being discharged.

The cooling system shall also be setup in a way that the cooling system lines can be easily drained through the master pump drain.

The cooling system lines shall consist of high-pressure, high-temperature 3/8" (inside diameter) abraded rubber hose. The engine cooling lines shall be installed with one (1) line going from the discharge side of the water pump through an Innovative Controls, model 3004204-2-2, 3/8" in-line quarter turn ball valve assembly and continuing on to the chassis heat exchanger. The return line from the heat exchanger shall then run into the suction side of the pump. The pump cooling lines shall be installed with one (1) line going from the discharge side of the water pump through an Innovative Controls, model 3004204-2-2, 3/8" in-line quarter-turn ball valve assembly up to the water tank. At the water tank, the pump cooling line shall be plumbed into a 3/8" check valve on the "Tank Fill" valve. The check valve shall prevent tank water from back flowing into the pump when the cooling system is not in use. A return line from the water tank shall be plumbed into the water pump.

The engine cooling system valve shall be controlled on the operator's panel, and shall be clearly labeled, "Engine Cooler".

The pump cooling system valve shall be controlled on operators panel, and shall be clearly labeled, "Pump Cooler".

AROUND THE PUMP (ATP) FOAM SYSTEM, 1500GPM, A SYSTEM, SINGLE TANK

A Williams Fire & Hazard Control, Inc. Model #WATP-1500V-A around the pump foam proportioning system shall be provided for the purpose of proportioning Class A foam concentrates into the suction side of fire pump. The system shall have foam solution capacities of 130-3750GPM @ .25% - 6% for Class A foam concentrates utilizing a common, infinitely adjustable metering valve and associated system components. The system shall be capable of operating at pump suction pressures up to 33% of pump main discharge pressure and shall produce foam solution at all discharge outlets simultaneously when in operation.

CONTROL PANEL

The foam system shall be controlled from the pump operators position and shall have a system control panel to include the following three controls:

System ON / OFF control valve

Flush ON / OFF control valve

Foam source control switch (TANK / AUXILIARY)

FOAM CONCENTRATE EDUCTOR

A Williams 2”, High-Head jet pump eductor shall be provided for installation within the fire pump intake housing/piping to introduce foam concentrate into the suction side of the fire pump. The jet pump shall be supplied motive water from the fire pump discharge

housing/piping when in operation. The jet pump eductor shall be capable of operating at pump suction pressures up to 33% of pump main discharge pressure.

AUXILIARY FOAM INLET AND FOAM PICK-UP TUBE

There will be a 2" auxiliary foam inlet installed with a 2" x 12" clear PVC foam pick-up tube. There will be a 2" chrome cap with a chain on the inlet.

METERING VALVE

A common, infinitely adjustable proportioning metering valve shall be provided at the operator's position to allow for system proportioning capacity settings. Metering valve shall be of bronze construction with Teflon seats. Valve shall permit operator selection of .250, .500, 1.0, 3 .0 and 6.0% proportioning settings at six specific and infinite intermediate solution flow rates and shall have integral OFF capability.

FOAM SUCTION STRAINER

A 2” bronze “Y” strainer with blow-down port shall be provided and installed within the jet pump foam suction piping to protect the foam system from foreign matter.

FOAM SUCTION CHECK VALVE

One, 2” check valve shall be provided and installed within the jet pump eductor foam suction piping to prevent back pressure and flushing water contamination of the foam concentrate storage tank.

FOAM OFF TRUCK INLET CHECK VALVE

One, 2” check valve shall be provided and installed for the off truck foam pickup. The valve will keep foam from the foam tank from back feeding into the off truck tote if personnel forget to close the tank valve when using the off truck portion of the system.

FOAM CONCENTRATE & FLUSHING INTAKE

A 2” gated foam concentrate and flushing intake located on the pump enclosure panel shall be provided. The quarter turn valve shall be provided with 2” male NPT threads and NPSH cap with retaining chain. The intake shall be piped to the foam jet pump suction piping between the A tank suction check valve and strainer and shall be utilized for external Class A foam concentrate source operation.

MOTIVE WATER CONTROL VALVE

A 1-1/2” manual motive water flow control valve shall be provided for installation in a minimum 1-1/2” port in the fire pump discharge housing/piping to supply pressurized motive water to the jet pump eductor water inlet to allow system operation. The valve shall be controlled from the main system control panel.

MOTIVE WATER STRAINER

A 1-1/2” bronze “Y” strainer with blow-down port shall be provided and installed within the jet pump motive water supply line to protect the foam system jet pump eductor inlet from foreign matter.

FLUSHING WATER VALVE

A 1” manual valve shall be provided for installation in a minimum 1” port in the fire pump discharge housing/piping for the purpose of utilizing the water pump for foam system flushing. The valve shall be controlled at the main system control panel.

FOAM SYSTEM PLUMBING

Piping and fittings outboard of the foam jet pump eductor shall be stainless steel, brass and/or high-pressure hose and shall not contain any galvanizing pipe due to potential adverse reactions with foam liquids. Victaulic or equivalent grooved couplings shall be used throughout the piping system to allow for chassis flex and ease of dismantling for repairs and maintenance. All gasket materials shall be compatible with foam liquids.

NFPA #1901 DESIGN AND PERFORMANCE REQUIREMENTS

The proportioning system shall be capable of proportioning foam concentrate in accordance with the foam concentrate manufacturer's recommendations for the types of foam concentrates used in the system over the system design range of flow and pressures. The foam proportioning system water flow characteristics and the range of proportioning ratios shall be specified as noted herein.

The foam system shall be in compliance with the current applicable sections of NFPA #1901 as it relates to this specified foam system. Foam system manufacturer options and/or components may be required in addition to those listed within these specifications to provide for full NFPA #1901 compliance as it relates to this specified foam system.

FOAM SYSTEM CONTROLS

The foam proportioning system operating controls shall be located at or near the pump operator's position and shall be clearly identified.

Foam proportioning systems that incorporate foam concentrate metering valves shall have each metering valve calibrated and marked to indicate the rates of the foam concentrate proportioning available as determined by the design of the system.

LABELS, NAMEPLATES, AND INSTRUCTIONS SPECIFICATION

An instruction plate shall be provided for the foam proportioning system that includes, at a minimum, piping schematic of the system and basic operating instructions. A nameplate that is marked clearly with the identification and function shall be provided for each control, gauge, and indicator related to the foam proportioning system.

A label shall be provided on the pump operator's panel that identifies the types of foam concentrates that the foam proportioning system is designed to use. It shall also state the minimum/maximum foam proportioning rates at the minimum/maximum foam proportioning rated system flow and pressure.

MANUALS

Two (2) copies of an operations and maintenance manual shall be provided. They shall include a complete system diagram together with operating instructions and details outlining all recommended maintenance procedures.

Class "A" foam shall be utilized.

A single foam flush system shall be installed to provide a clean water flush of the foam concentrate pump preventing foam concentrates from mixing and possible jelling. Clean water from the booster tank shall be plumbed to a 1/4 turn valve located on the pump panel. The valve shall be capable of operating pressures to 500 psi.

YELLOW BACKGROUND PLATE

There shall be a yellow painted background plate located on the pump panel directly behind the foam system controls.

FOAM PROPORTIONING SYSTEM TESTING

The foam proportioning system shall be tested and certified after final installation as per NFPA 1901.

PLUMBING MANIFOLD

The plumbing manifold shall consist of the inlet side manifold and the discharge side manifold. Galvanized Victaulic couplings shall be used wherever possible for ease of maintenance and superior corrosion protection.

The inlet side of the plumbing manifold shall utilize schedule 10, 304 grade stainless steel tubing and preformed elbows for inlets that are larger than 3”. Side auxiliary inlets that are 3” or smaller shall utilize schedule 40, 304 grade stainless steel threaded tubing and preformed elbows. The inlet manifold shall thread into the pump auxiliary inlet ports and each inlet valve shall thread onto the inlet manifold.

The discharge side of the plumbing manifold shall utilize schedule 40, 304 grade stainless steel tubing and preformed elbows to ensure the quality of the manifold where welds are required. The discharge manifold shall connect to the pump discharge ports using ½” stainless steel flanges that shall be machined to seat an O-ring to ensure a leak proof seal. Each discharge shall derive from a port on the manifold assembly

connected to a discharge valve with 1/2” 304 grade stainless steel flanges. Discharges that terminate in a location other than the pump module (i.e. rear discharges) that do not require welding shall utilize a combination of high pressure flex hose and schedule 10, 304 grade stainless steel tubing to allow flexibility between the body and the pump module.

INNOVATIVE CONTROLS DISCHARGE GAUGES - 2-1/2" - 0-400PSI

The discharge gauges on the apparatus shall be 2 ½” (63mm) diameter Innovative Controls pressure gauges. The gauges shall have a one-piece die-cast brass case that integrates the valve stem connection, movement support, and bourdon tube support into a single unit that eliminates distortion and leakage. Clear scratch resistant molded lenses shall be used to ensure distortion-free viewing and they shall be sealed to the gauge by being
trapped together with a profile gasket by a crimped stainless steel bezel. The gauges shall be filled with a synthetic mixture to dampen shock and vibration, lubricate the internal mechanisms, prevent lens condensation and ensure proper operation from –40° F to +160°F.

The gauges shall exceed ASME B40.100 Grade B requirements with an accuracy of +/- 1.5% full scale and include a size appropriate phosphorous bronze bourdon tube with a reinforced lap joint and large tube base to increase the tube life and gauge accuracy.

Highly-polished stainless steel bezels shall be provided to prevent corrosion and protect lenses and gauge cases. The gauges shall be installed into decorative chrome-plated mounting bezels that incorporate valve identifying verbiage and/or color labels.

The gauges shall display a range from 0 to 400 psi and shall have an orange tip on the pointer.

MASTER PRESSURE CENTER ASSEMBLY

The master gauges shall be installed on the pump panel no more than 6 inches apart in an integrated master pressure assembly that includes the two (2) master gauges and the test port manifold.

The master intake and master discharge gauges shall be 4” (101mm) diameter Innovative Controls pressure gauges. Each gauge shall have a one-piece die-cast brass case that integrates the valve stem connection, movement support, and bourdon tube support into a single unit that eliminates distortion and leakage. A clear scratch resistant molded lens shall be used to ensure distortion-free viewing and it shall be sealed to the gauge by being trapped together with a profile gasket by a crimped stainless steel bezel. The gauge shall be filled with a synthetic mixture to dampen shock and vibration, lubricate the internal mechanisms, prevent lens condensation and ensure proper operation from –40°F to +160°F.

Each gauge shall exceed ASME B40.100 Grade B requirements with an accuracy of +/- 1% full scale and include a size appropriate phosphorous bronze bourdon tube with a reinforced lap joint and large tube base to increase the tube life and gauge accuracy. A highly-polished stainless steel bezel shall be provided to prevent corrosion and protect the lens and gauge case.

The two (2) master gauges shall be installed into a decorative chrome-plated zinc mounting bezel that also incorporates a test port manifold and a graphic overlay that identifies the master intake and discharge gauges, the vacuum test port, and the pressure test port. The test port manifold is solid cast brass with chrome-plated plugs.

The gauge on the left shall be the master pump intake gauge and display a range from 0 to 400 psi with black graphics on a white background. The gauge on the right shall be the master pump discharge gauge and display a range from -30 to 400 psi with burgundy graphics on a white background.

The non-Storz discharge and intake fittings provided on this apparatus shall be South Park Corp. Brand. The adapter/cap/plug fittings shall be manufactured from high quality brass that shall be polished to remove manufacturing irregularities with a chrome finish applied to the polished surface.

The Storz discharge and intake fittings provided on this apparatus shall be Task Force Tips Brand. For corrosion resistance, the adapter shall be constructed of hard coat anodized aluminum alloy and include a polymer bearing ring for prevention of galvanic corrosion.

The inlets shall terminate with NST swivels, and the discharges shall terminate with NST male threads.

DISCHARGE, PRE-CONNECT, AND INTAKE DRAINS

There shall be a Innovative Controls 3/4" quarter turn drain valve included on each discharge, gated intake, and steamer valve (if applicable). There shall be a side stem, long stroke chrome plated lift handle provided on the drain valve to facilitate use with a gloved hand. The drain valve shall a verbiage tag that angles upward so that it can easily be seen and rear by the operator before opening. The drain valve shall be located just above the running board and below the pump panel to reduce clutter in the pump panel area. The drain valve shall be connected to the valve with flexible hose that is routed in such a manner as to assure complete drainage to below the apparatus. A matching color coded bezel shall be included.

2" TANK FILL

There shall be a 2" tank fill plumbed from the pump to the tank. Installation shall be completed with 2" Class 1 rubber hose and stainless steel hose couplings.

An Akron Brass, model 8820, 2" Swing-Out™ valve shall be provided. The valve shall have an all 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 lubrication of seats or any other internal waterway parts, and must be capable of swinging out of the waterway for maintenance by the removal of six bolts. The valve shall carry a ten (10) year warranty by the valve manufacturer.

The valve shall be actuated by an Akron Brass, model R1 manual actuator installed on the valve. The manual actuator shall be controlled by an Innovative Controls push/pull T- handle.

3" TANK-TO-PUMP

There shall be a 3" tank-to-pump plumbed with a Class 1 flexible hose from the tank to the suction side of the pump. There shall be an Akron Brass, model 8830, 3" Swing-Out™ valve shall be provided. The valve shall have an all 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 lubrication of seats or any other internal waterway parts, and must be capable of swinging out of the
manufactured and assembled in the United States. The waterway for maintenance by the removal of six bolts. The valve shall also include a necessary B3-SH pump flange adapter, which shall be specifically used for the tank-to-pump line to properly adjust the plumbing based on the pitch of the pump. The valve shall carry a ten (10) year warranty by the valve manufacturer.

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

The valve shall be actuated by an Akron Brass, model R1 manual actuator. The manual actuator shall be controlled by an Innovative Controls push/pull T-handle.

The tank plumbing valves and controllers shall have the OEM Standard label package unless stated otherwise. The Pump-to-Tank Fill shall be labeled "TANK FILL" and shall have a Black label color. The Tank-To-Pump shall be labeled "TANK TO PUMP" and shall have a Navy Blue label color.

6" DRIVER SIDE STEAMER INLET

There shall be a 6" steamer inlet located on the driver's side of the pump module. The suction fittings shall include a removable die-cast screen to provide cathodic protection for the pump thus reducing corrosion. A short steamer barrel shall be installed to accommodate an intake valve without exceeding the legal overall body width. The intake shall terminate MNST thread.

There shall be one (1) Trident model 01.003.9, 6" NST vented long handle steamer cap provided. The cap shall have a chrome finish.

2-1/2" DRIVER'S SIDE INLET

There shall be a 2-1/2" gated inlet, with 2-1/2" plumbing, provided on the driver's side of the pump module. The inlet shall be fully recessed behind the panel in order to keep the valve protected from the elements.

An Akron Brass, model 8825, 2-1/2" Swing-Out™ valve shall be provided. The valve shall have an all brass body with flow optimizing stainless steel ball and dual polymer seats. The valve shall be capable of dual directional flow while incorporating a specially designed flow optimizing stainless steel ball. The valve shall not require lubrication of seats or any other internal waterway parts, and must be capable of swinging out of the waterway for maintenance by the removal of six bolts. The valve shall carry a ten (10) year warranty by the valve manufacturer.

The valve shall be actuated by an Akron Brass, model TSC manual actuator installed directly on the valve. The handle shall allow the valve to be controlled directly at the valve.

There shall be one (1) South Park, model HPC3008AC, 2 1/2" NST plug with chain provided.

6" OFFICER SIDE STEAMER INLET

There shall be a 6" steamer inlet located on the officer's side of the pump module. The suction fittings shall include a removable die-cast screen to provide cathodic protection for the pump thus reducing corrosion. A short steamer barrel shall be installed to accommodate an intake valve without exceeding the legal overall body width. The intake shall terminate MNST thread.

There shall be one (1) Trident model 01.003.9, 6" NST vented long handle steamer cap provided. The cap shall have a chrome finish.

2-1/2" OFFICER'S SIDE INLET

There shall be a 2-1/2" gated inlet, with 2-1/2" plumbing, provided on the officer's side of the pump module. The inlet shall be fully recessed behind the panel in order to keep the valve protected from the elements.

An Akron Brass, model 8825, 2-1/2" Swing-Out™ valve shall be provided. The valve shall have an all brass body with flow optimizing stainless steel ball and dual polymer seats. The valve shall be capable of dual directional flow while incorporating a specially designed flow optimizing stainless steel ball. The valve shall not require lubrication of seats or any other internal waterway parts, and must be capable of swinging out of the waterway for maintenance by the removal of six bolts. The valve shall carry a ten (10) year warranty by the valve manufacturer.

The valve shall be actuated by an Akron Brass, model TSC manual actuator installed directly on the valve. The handle shall allow the valve to be controlled directly at the valve.

There shall be one (1) South Park, model HPC3008AC, 2 1/2" NST plug with chain provided.

All intakes shall have the OEM Standard label package unless stated otherwise. All intake labels shall be burgundy in color. Specific verbiage on each intake label tag shall be determined at the pre-construction meeting.

2-1/2" DRIVER'S SIDE DISCHARGE

There shall be a 2-1/2" discharge, with 2-1/2" plumbing, located on the driver's side of the pump compartment. The discharge shall terminate MNST.

The discharge shall be foam capable.

An Akron Brass model 8625 2-1/2" Swing-Out™ valve shall be provided. The valve shall have an all brass body with flow optimizing stainless steel ball and dual polymer seats. The valve shall be capable of dual directional flow while incorporating a specially designed flow optimizing stainless steel ball. The valve shall not require lubrication of seats or any other internal waterway parts, and must be capable of swinging out of the waterway for maintenance by the removal of six bolts. The valve shall carry a ten (10) year warranty by the valve manufacturer.

The valve shall be actuated by an Akron Brass rack and sector actuator installed on the valve. The manual actuator shall be controlled by an Innovative Controls push/pull T-handle.

The discharge shall have a 2-1/2" brass case gauge with bezel and a display range from 0 to 400 psi. The gauge shall have a black dial graphic and an orange tip on the pointer.

There shall be one (1) South Park, model SE394505AC, 2-1/2" Female NST swivel rocker lug x 2-1/2" Male NST 45º elbow adapter provided.

There shall be one (1) South Park model HCC2808AC, 2-1/2" NST vented rocker lug cap with chain provided.

2-1/2" DRIVER'S SIDE DISCHARGE

There shall be a 2-1/2" discharge, with 2-1/2" plumbing, located on the driver's side of the pump compartment. The discharge shall terminate MNST.

The discharge shall be foam capable.

An Akron Brass model 8625 2-1/2" Swing-Out™ valve shall be provided. The valve shall have an all brass body with flow optimizing stainless steel ball and dual polymer seats. The valve shall be capable of dual directional flow while incorporating a specially designed flow optimizing stainless steel ball. The valve shall not require lubrication of seats or any other internal waterway parts, and must be capable of swinging out of the waterway for maintenance by the removal of six bolts. The valve shall carry a ten (10) year warranty by the valve manufacturer.

The valve shall be actuated by an Akron Brass rack and sector actuator installed on the valve. The manual actuator shall be controlled by an Innovative Controls push/pull T-handle.

The discharge shall have a 2-1/2" brass case gauge with bezel and a display range from 0 to 400 psi. The gauge shall have a black dial graphic and an orange tip on the pointer.

There shall be one (1) South Park, model SE394505AC, 2-1/2" Female NST swivel rocker lug x 2-1/2" Male NST 45º elbow adapter provided.

There shall be one (1) South Park model HCC2808AC, 2-1/2" NST vented rocker lug cap with chain provided.

2-1/2" OFFICER'S SIDE DISCHARGE

There shall be a 2-1/2" discharge, with 2-1/2" plumbing, located on the officer's side of the pump compartment. The discharge shall terminate MNST.

The discharge shall be foam capable.

An Akron Brass, model 8825, 2-1/2" Swing-Out™ valve shall be provided. The valve shall have an all brass body with flow optimizing stainless steel ball and dual polymer seats. The valve shall be capable of dual directional flow while incorporating a specially designed flow optimizing stainless steel ball. The valve shall not require lubrication of seats or any other internal waterway parts, and must be capable of swinging out of the waterway for maintenance by the removal of six bolts. The valve shall carry a ten (10) year warranty by the valve manufacturer.

The valve shall be actuated by an Akron Brass, model R1, manual actuator installed on the valve. The manual actuator shall be controlled by an Innovative Controls push/pull T- handle.

The discharge shall have a 2-1/2" brass case gauge with bezel and a display range from 0 to 400 psi. The gauge shall have a black dial graphic and an orange tip on the pointer.

There shall be one (1) South Park, model SE394505AC, 2-1/2" Female NST swivel rocker lug x 2-1/2" Male NST 45º elbow adapter provided.

There shall be one (1) South Park model HCC2808AC, 2-1/2" NST vented rocker lug cap with chain provided.

4" OFFICER'S SIDE DISCHARGE

There shall be a 4" large diameter discharge, with 4" plumbing, located on the officer's side of the pump compartment. The discharge shall terminate MNST.

The discharge shall be foam capable.

An Akron Brass, model 8830, 3" Swing-Out™ valve shall be provided. The valve shall have an all brass body with flow optimizing stainless steel ball and dual polymer seats. The valve shall be capable of dual directional flow while incorporating a specially designed flow optimizing stainless steel ball. The valve shall not require lubrication of seats or any other internal waterway parts, and must be capable of swinging out of the waterway for maintenance by the removal of six bolts. The valve shall carry a ten (10) year warranty by the valve manufacturer.

The valve shall be actuated by an Akron Brass, model R1, manual actuator installed on the valve. The actuator shall include an Akron Brass, model 7875, Slo-Cloz™ to control the opening and closing speed of the valve to minimize the effects of water hammer.

The valve actuator shall be controlled by an Elkhart Brass, model RC-10, handwheel valve controller. The 5" cast aluminum handwheel shall be connected to the remote mounted valve. The actuator housing and push-rod shall be constructed of light weight extruded aluminum. A precision needle thrust bearing and hardened thrust washers shall assure smooth, efficient operation and accurate flow and pressure control capability.
Opening and closing speed shall comply with the current NFPA standard to minimize effects of water hammer.

A valve position indicator shall show the position of the ball valve as per NFPA 1901. The valve position indicator shall provide the pump operator with the status of the valve at a glance. Red shall mean fully closed; Green shall mean fully opened; Yellow shall indicate a gated position. LED lamps shall provide a reliable signal with a wide viewing angle even in bright sun light. Reliable solid state valve position sensors shall be water and lubricant resistant. The integrated circuit board and lamp sockets shall be completely encased in epoxy for total protection from the elements.

The discharge shall have a 2-1/2" brass case gauge with bezel and a display range from 0 to 400 psi. The gauge shall have a black dial graphic and an orange tip on the pointer.

There shall be one (1) Task Force Tips, model #AH3SP-NP 30 degree elbow provided. The elbow shall be configured with a 4" swivel Storz coupling and a 4" female NH swivel rocker lug coupling.

There shall also be one (1) Task Force Tips, model A01SP 4" Storz blind cap with lanyard provided.

1-1/2" FRONT BUMPER DISCHARGE

There shall be a 1-1/2" discharge located inside the officer's side hosewell of the front bumper. The discharge shall be plumbed with 2" plumbing and high pressure flex hose with stainless steel couplings. The discharge shall terminate MNST.

The discharge shall have Class1 model 34AD automatic drains installed in the low routed areas below the manual drain. The automatic drains shall open whenever pressure in the line drops below 6 psi.

The discharge shall be foam capable.

An Akron Brass, model 8820, 2" Swing-Out™ valve shall be provided. The valve shall have an all brass body with flow optimizing stainless steel ball and dual polymer seats. The valve shall be capable of dual directional flow while incorporating a specially designed flow optimizing stainless steel ball. The valve shall not require lubrication of seats or any other internal waterway parts, and must be capable of swinging out of the waterway for maintenance by the removal of six bolts. The valve shall carry a ten (10) year warranty by the valve manufacturer.

The valve shall be actuated by an Akron Brass, model R1, manual actuator installed on the valve. The manual actuator shall be controlled by an Innovative Controls push/pull T- handle.

The discharge shall have a 2-1/2" brass case gauge with bezel and a display range from 0 to 400 psi. The gauge shall have a black dial graphic and an orange tip on the pointer.

The discharge shall be designated as a pre-connect and no cap and chain shall be supplied.

2-1/2" DRIVER'S SIDE REAR DISCHARGE

There shall be a 2-1/2" discharge, with 2-1/2" plumbing, located on the driver's side rear of the apparatus. The discharge shall terminate MNST.

The discharge shall be foam capable.

An Akron Brass, model 8825, 2-1/2" Swing-Out™ valve shall be provided. The valve shall have an all brass body with flow optimizing stainless steel ball and dual polymer seats. The valve shall be capable of dual directional flow while incorporating a specially designed flow optimizing stainless steel ball. The valve shall not require lubrication of seats or any other internal waterway parts, and must be capable of swinging out of the waterway for maintenance by the removal of six bolts. The valve shall carry a ten (10) year warranty by the valve manufacturer.

The valve shall be actuated by an Akron Brass, model R1, manual actuator installed on the valve. The manual actuator shall be controlled by an Innovative Controls push/pull T- handle.

The discharge shall have a 2-1/2" brass case gauge with bezel and a display range from 0 to 400 psi. The gauge shall have a black dial graphic and an orange tip on the pointer.

There shall be one (1) South Park, model SE394505AC, 2-1/2" Female NST swivel rocker lug x 2-1/2" Male NST 45º elbow adapter provided.

The discharge shall be designated as a preconnect and no cap and chain shall be supplied.

2-1/2" OFFICER'S SIDE REAR DISCHARGE

There shall be a 2-1/2" discharge, with 2-1/2" plumbing, located on the officer's side rear of the apparatus. The discharge shall terminate MNST.

The discharge shall be foam capable.

An Akron Brass, model 8825, 2-1/2" Swing-Out™ valve shall be provided. The valve shall have an all brass body with flow optimizing stainless steel ball and dual polymer seats. The valve shall be capable of dual directional flow while incorporating a specially designed flow optimizing stainless steel ball. The valve shall not require lubrication of seats or any other internal waterway parts, and must be capable of swinging out of the waterway for maintenance by the removal of six bolts. The valve shall carry a ten (10) year warranty by the valve manufacturer.

The valve shall be actuated by an Akron Brass, model R1, manual actuator installed on the valve. The manual actuator shall be controlled by an Innovative Controls push/pull T- handle.

The discharge shall have a 2-1/2" brass case gauge with bezel and a display range from 0 to 400 psi. The gauge shall have a black dial graphic and an orange tip on the pointer.

There shall be one (1) South Park, model SE394505AC, 2-1/2" Female NST swivel rocker lug x 2-1/2" Male NST 45º elbow adapter provided.

The discharge shall be designated as a preconnect and no cap and chain shall be supplied.

CROSSLAY CONFIGURATION

There shall be two (2) 1-1/2" and one (1) 2-1/2" crosslay pre-connects located above the pump panel. Class1 high-pressure flex hose with stainless steel couplings shall be used in the plumbing.

A Trident 90º swivel elbow shall be utilized to keep the hose from kinking when pulled from either side of the apparatus. The swivel for each crosslay shall be located outboard for ease of making connections while changing hose.

The pre-connect hose beds shall be sized to accommodate the following hose load:

The interior of the pre-connect hose bed shall have a maintenance free abraded

finish. The floor of the crosslay shall be slotted sufficiently for drainage

Stainless steel rollers shall be provided at each end of the crosslay hose bed to facilitate deployment of hose. Vertical rollers shall be installed on each side of the hose bed opening, and a horizontal roller shall be installed under the opening.

There shall be two (2) dividers in the crosslay area. Each divider shall be fabricated of 3/16" aluminum and be mounted in a channel on each end for adjustability. The dividers shall have a maintenance free abraded finish.

There shall be a heavy duty 22 oz. hypalon vinyl coated nylon cover located over the top and on each end of the pre-connected crosslays. The top of the cover shall be connected to the top-forward portion of the crosslays through a C-Rail channel and shall attach on the top-rear portion using Velcro. The bottom of the end covers shall be connected using footman loop and J-Hooks with an adjustable buckle. The cover color shall be red.

The end covers of the crosslays shall be incorporated with the top cover.

1-1/2" PRECONNECT

There shall be a 1-1/2" preconnect with 2" plumbing. The preconnect shall terminate out a swivel MNST.

The 1-1/2" crosslay pre-connect shall have a capacity of 200' of 1-3/4" double jacket fire hose stored in a double stack.

The discharge shall be foam capable.

An Akron Brass, model 8820, 2" Swing-Out™ valve shall be provided. The valve shall have an all brass body with flow optimizing stainless steel ball and dual polymer seats. The valve shall be capable of dual directional flow while incorporating a specially designed flow optimizing stainless steel ball. The valve shall not require lubrication of seats or any other internal waterway parts, and must be capable of swinging out of the waterway for maintenance by the removal of six bolts. The valve shall carry a ten (10) year warranty by the valve manufacturer.

The valve shall be actuated by an Akron Brass, model R1, manual actuator installed on the valve. The manual actuator shall be controlled by an Innovative Controls push/pull T- handle.

The discharge shall have a 2-1/2" brass case gauge with bezel and a display range from 0 to 400 psi. The gauge shall have a black dial graphic and an orange tip on the pointer.

The discharge shall be designated as a pre-connect and no cap and chain shall be supplied.

<u>1-1/2" PRECONNECT</u>

There shall be a 1-1/2" preconnect with 2" plumbing. The preconnect shall terminate out a swivel MNST.

The 1-1/2" crosslay pre-connect shall have a capacity of 200' of 1-3/4" double jacket fire hose stored in a double stack.

The discharge shall be foam capable.

An Akron Brass, model 8820, 2" Swing-Out™ valve shall be provided. The valve shall have an all brass body with flow optimizing stainless steel ball and dual polymer seats. The valve shall be capable of dual directional flow while incorporating a specially designed flow optimizing stainless steel ball. The valve shall not require lubrication of seats or any other internal waterway parts, and must be capable of swinging out of the waterway for maintenance by the removal of six bolts. The valve shall carry a ten (10) year warranty by the valve manufacturer.

The valve shall be actuated by an Akron Brass, model R1, manual actuator installed on the valve. The manual actuator shall be controlled by an Innovative Controls push/pull T- handle.

The discharge shall have a 2-1/2" brass case gauge with bezel and a display range from 0 to 400 psi. The gauge shall have a black dial graphic and an orange tip on the pointer.

The discharge shall be designated as a pre-connect and no cap and chain shall be supplied.

2-1/2" PRECONNECT

There shall be a 2-1/2" preconnect with 2-1/2" plumbing. The preconnect shall terminate out a swivel MNST.

The 2-1/2" crosslay pre-connect shall have a capacity of 250' of 2-1/2" double jacket fire hose stored in a double stack.

The discharge shall be foam capable.

An Akron Brass, model 8825, 2-1/2" Swing-Out™ valve shall be provided. The valve shall have an all brass body with flow optimizing stainless steel ball and dual polymer seats. The valve shall be capable of dual directional flow while incorporating a specially designed flow optimizing stainless steel ball. The valve shall not require lubrication of seats or any other internal waterway parts, and must be capable of swinging out of the waterway for maintenance by the removal of six bolts. The valve shall carry a ten (10) year warranty by the valve manufacturer.

The valve shall be actuated by an Akron Brass, model R1, manual actuator installed on the valve. The manual actuator shall be controlled by an Innovative Controls push/pull T- handle.

The discharge shall have a 2-1/2" brass case gauge with bezel and a display range from 0 to 400 psi. The gauge shall have a black dial graphic and an orange tip on the pointer.

The discharge shall be designated as a pre-connect and no cap and chain shall be supplied.

BOOSTER REEL

There shall be a Hannay aluminum fabricated electric rewind booster reel, with a capacity of 200' of 1" booster hose, installed on the apparatus. The booster reel shall be painted Hannay Silver. An automatic brake and an auxiliary manual rewind crank shall be supplied.

The booster reel shall be mounted above the pump in the dunnage compartment.

The discharge shall be foam capable.

An Akron Brass, model 8815 1-1/2" Swing-Out™ valve shall be provided. The valve shall have an all brass body with flow optimizing stainless steel ball and dual polymer seats. The valve shall be capable of dual directional flow while incorporating a specially designed flow optimizing stainless steel ball. The valve shall not require lubrication of seats or any other internal waterway parts, and must be capable of swinging out of the waterway for maintenance by the removal of six bolts. The valve shall carry a ten (10) year warranty by the valve manufacturer.

The valve shall be actuated by an Akron Brass, model R1, manual actuator installed on the valve. The manual actuator shall be controlled by an Innovative Controls push/pull T- handle.

There shall be two (2) sections of 100' x 1" of 800 lb. test booster hose coupled with 1" NST pyrolite couplings installed on the booster reel.

There shall be a rubber covered push button switch located on the booster reel for the rewind control of the reel.

3" DELUGE RISER DISCHARGE

There shall be a 3" discharge for the deluge located above the pump module. The discharge shall be centered in the pump module and the riser shall terminate 3" NPT.

The discharge shall be foam capable.

An Akron Brass, model 8830, 3" Swing-Out™ valve shall be provided. The valve shall have an all brass body with flow optimizing stainless steel ball and dual polymer seats. The valve shall be capable of dual directional flow while incorporating a specially designed flow optimizing stainless steel ball. The valve shall not require lubrication of seats or any other internal waterway parts, and must be capable of swinging out of the waterway for maintenance by the removal of six bolts. The valve shall carry a ten (10) year warranty by the valve manufacturer.

The valve shall be actuated by an Akron Brass, model R1, manual actuator installed on the valve. The actuator shall include an Akron Brass, model 7875, Slo-Cloz™ to control the opening and closing speed of the valve to minimize the effects of water hammer.

The valve actuator shall be controlled by an Elkhart Brass, model RC-10, handwheel valve controller. The 5" cast aluminum handwheel shall be connected to the remote mounted valve. The actuator housing and push-rod shall be constructed of light weight extruded aluminum. A precision needle thrust bearing and hardened thrust washers shall assure smooth, efficient operation and accurate flow and pressure control capability.
Opening and closing speed shall comply with the current NFPA standard to minimize effects of water hammer.

A valve position indicator shall show the position of the ball valve as per NFPA 1901. The valve position indicator shall provide the pump operator with the status of the valve at a glance. Red shall mean fully closed; Green shall mean fully opened; Yellow shall indicate a gated position. LED lamps shall provide a reliable signal with a wide viewing angle even in bright sun light. Reliable solid state valve position sensors shall be water and lubricant resistant. The integrated circuit board and lamp sockets shall be completely encased in epoxy for total protection from the elements.

The discharge shall have a 2-1/2" brass case gauge with bezel and a display range from 0 to 400 psi. The gauge shall have a black dial graphic and an orange tip on the pointer.

TASK FORCE TIPS 3" SCREW-ON NPT ADAPTER

There shall be one (1) Task Force Tips, model XFF-APL, 3" NPT female truck adapter supplied on the apparatus. The hard coat anodized adapter shall allow the Crossfire monitor to be easily utilized as a truck mounted deluge appliance.

TASK FORCE TIPS CROSSFIRE MONITOR

There shall be one (1) Task Force Tips Crossfire, model XFT-NJ, manual monitor with 3" NPT inlet provided on the apparatus. The waterway shall be 3-1/4", which shall allow for the delivery of up to 1250 gpm with low friction loss. Horizontal rotation is securely locked with a simple lever, and position can be visually confirmed. Seven (7) turns of the hand wheel shall change the discharge elbow from vertical to the stop elevation. The monitor shall include a highly visible pressure gauge and built-in automatic drain valve.

The monitor shall be powder-coated Silver by the monitor manufacturer and shall not be repainted by the OEM.

MONITOR NOZZLES

There shall be one (1) Task Force Tips, model M-R1250-NN, automatic master stream nozzle with 3-1/2" NH thread swivel base provided. The nozzle shall be capable of producing an excellent stream at any volume from 300 gpm to 1250 gpm. The nozzle shall feature a pressure adjustment knob, which allows the operating pressure to be adjusted to tactile detent settings between 70 and 120 psi. The nozzle shall include rubber bumper incorporate TFT "power fog" teeth for fully-filled, finger-free fog pattern. The nozzle shall be lightweight hard coat anodized aluminum for maximum resistance to corrosion and wear.

There shall be one (1) Task Force Tips, model XF-SS10, 10" stream shaper provided.

There shall be one (1) set of Task Force Tips, model MST-4NJ, quad stacked tips with 2-1/2" NH thread provided.

ELECTRICAL SYSTEM

Wiring harnesses shall be the automotive type, engineered specifically for the builder's apparatus, and shall meet the following criteria. Under no circumstances shall diodes, resistors, or fusible links be located within the wiring harness. All such components shall be located in an easy to access wiring junction box or the main circuit breaker area. All wiring shall meet white book, baseline advanced design transit coach specification and Society of Automotive Engineers recommended practices. It shall be stranded copper wire core with cross linked polyethylene insulation complying with SAE specification J1128. Each wire shall be hot stamp function coded every three inches starting one inch from the end and continuing throughout the entire harness. In addition to function coding, each wire shall be number, color, and gauge coded.

Wire harnesses shall be wrapped with a high abrasion and chemical resistant thermoplastic polyester elastomer coated polyester yarn for braiding constructions of electrical wiring systems. The braid yarn shall have a minimum tensile strength of 15 lbs. before breaking and have a maximum of 20% elongation before breaking. Temperature properties for the yarn shall range from a minimum 280°F (138°C) service temperature to a maximum -112°F (-80°C) brittleness temperature with a cold flex tolerance of at least -49°F (-45°C).

Harnesses shall be modular in design; a main harness system subdivided into several smaller sub-harnesses. The harness subsections shall be connected using Deutsch branded, heavy duty, environmentally sealed, connectors with silicone seals and a rear insertion/removal contact system. For isolation of electrical "zones" the harness subsections shall consist of a main harness, a pump harness with a separate pump gauge panel harness, a driver's side body harness with a separate driver's side compartment harness, a officer's side body harness with a separate officer's side compartment harness, and a rear body harness with two separate rear compartment harnesses.

The main harness and three body harnesses shall interconnect at a central, easy to reach location and their connectors shall not be obstructed by other harnesses or fuel/air lines. In addition, the main and body harness connectors shall be color coded for ease of identification with their respective colors noted on the accompanying electrical diagrams.

Where connectors are not provided by the electrical component manufacturer, all 12 volt lights and other electrical components (excluding rocker and toggle switches) shall connect to the harnesses using Deutsch brand connectors; butt connectors are considered unacceptable.

All Deutsch connectors shall meet the following criteria:

- All connectors shall have a minimum IP67 rating.
- Temperature range from -67°F (-55°C) to 257°F (125°C) continuous at rated current.
- Only solid contacts will be used. Stamped and formed contacts are unacceptable.
- All contacts shall be soldered unless a crimping tool or machine is used that gives an even and precise pressure for the terminal being used.
- All contacts shall be pull-tested to insure their integrity.

WEATHERPROOF DOOR SWITCHES

Due the harsh environment and susceptibility to moisture on the fire ground, the fire apparatus compartment doors shall utilize weatherproof switches. Two different types of switches shall be used. Weatherproof proximity switches shall be utilized. No Exceptions.

The switches shall be used for activation of the compartment lights and to provide a signal to the door open circuit in the cab.

V-MUX ELECTRICAL MANAGEMENT SYSTEM

The apparatus shall be equipped with a V-MUX Multiplex System. There are several key benefits to multiplexing, one is to reduce the number of connections in a vehicles electrical system, because of this it is important to limit the amount of modules that control certain functions of the vehicle.

Outputs:

The outputs shall perform all the following items without added modules to perform any of the tasks:

- Load Shedding: The System shall have the capability to Load Shed with 8 levels any output. This means you can specify which outputs (barring NFPA restrictions) you would like Load Shed. Level 1 12.9v, Level 2 12.5V, Level 3 - 12.1V, Level 4 - 11.7V, Level 5 11.3V, Level 6 10.9V, Level 7 10.5, Level 8 10.1. Unlike conventional load shedding devices you can assign a level to any or all outputs. No add-on modules shall be acceptable; the module with the outputs must perform this function.
- Load Sequencing: The System shall be able to sequence from 0 8 levels any output. With 0 being no delay and 1 being a 1 second delay, 2 being a 2 second delay and so on. Sequencing reduces the amount of voltage spikes and drops on your vehicle, and can help limit damage to your charging system. No add-on modules shall be acceptable; the module with the outputs must perform this function.
- Output Device: The System shall have solid-state output devices. Each

solid-state output shall be a MOS-FET (Metal Oxide Semiconductor - Field Effect Transistors); MOS-FETs are solid-state devices with no moving parts to wear out. A typical relay when loaded to spec has a life of 100,000 cycles. The life of a FET is more than 100 times that of a relay. No add-on modules shall be acceptable; the module with the outputs must perform this function.

- Flashing Outputs: The System shall be able to flash any output in either A or B phase, and logic is used to shut down needed outputs in park, or any one of several combined interlocks. The flash rate can be selected at either 80, or 160 FPM. This means any light can be specified with a multiplex truck with no need to add flashers. Flashing outputs can also be used to warn of problems. No add-on modules shall be acceptable; the module with the outputs must perform this function.
- PWM: The modules shall have the ability to PWM at some outputs so that a Headlight PWM module is not needed. No add-on modules shall be acceptable; the module with the outputs must perform this function.
- Diagnostics: An output shall be able to detect either a short or open circuit.

Inputs:

The inputs shall have the ability to switch by a ground or battery signal.
The inputs shall be filtered for noise suppression via hardware and software so that RF or dirty power will not trick an input into changing its status.

System Network:

The Multiplex system shall contain a Peer-to-Peer network. A Master Slave Type network is not suitable for the Fire/Rescue industry. A Peer-to-Peer network means that all the modules are equal on the network; a Master is not needed to tell other nodes when to talk.

System Reliability:

The Multiplex system shall be able to perform in extreme temperature conditions, from -40° to +85° C (-40° to +185° F.) The system shall be sealed against the environment, moisture, humidity, salt or fluids such as diesel fuel, motor oil or brake fluid. The enclosures shall be rugged to withstand being mounted in various locations or compartments around the vehicle. The modules shall be protected from over voltage and reverse polarity.

12 VOLT SYSTEMS TEST

After completion of the unit, the 12 volt electrical system shall undergo a battery of tests as listed in NFPA 1901. These tests shall include, but not be limited to:

- Reserve capacity test
- Alternator performance test at idle
- Alternator performance test at full load

- Low voltage alarm test

Certification of the results shall be supplied with the apparatus at the time of delivery.

TAIL LIGHTS

There shall be a Whelen 600 series LED tail light assembly installed on each side of the rear of the apparatus. Each assembly shall include one (1) red LED stop/tail combination light model number 60BTT, one (1) amber LED model 60A00TAR turn light with arrow and one (1) clear LED backup light model 60C00WCR. The lights shall be mounted in a chrome plated four (4) light composite housing. The remaining slot in the housing shall be filled with a warning light specified in the warning light section.

BODY GROUND LIGHTING

There shall be eight (8) Truck-Lite, model 44, 4" round LED lights shall be installed beneath the apparatus in areas where personnel may be expected to climb on and off of the apparatus. The lights shall illuminate the ground within 30" of the apparatus to provide visibility of any obstructions or hazards. These areas shall include, but shall not be limited to, side running boards and the rear step area.

The lights shall be activated when the parking brake is engaged and with the respective side turn signal.

CLEARANCE LIGHTS

Grote model 65282 red LED clearance lights shall be installed in the rear tailboard as necessary to be in full compliance with applicable ICC and DOT codes and regulations. Clearance reflectors shall be placed on the apparatus to be in full compliance with applicable ICC and DOT codes and regulations.

FIRECOM DIGITAL INTERCOM SYSTEM

There shall be a Firecom model 5100D digital intercom system provided on the apparatus. The system shall have a touch pad with digital logic control and LED indicators. It shall be compatible with VHF and UHF radios. The 5100D system shall have a total power input requirement for each system not to exceed two amps. It shall have independent transmit and receive level adjustments. The system shall have the capacity for up to four (4) headsets without reduction or fluctuation of sound level, regardless of the number of attached headsets. It shall have a separate 3.5 mm auxiliary input and output jack. The intercom control head shall be located in the optimal position by OEM unless otherwise specified by customer. The intercom shall have a two (2) year standard warranty from the intercom manufacturer.

CAB POSITIONS

The Firecom intercom system shall accommodate one (1) wired driver position, one (1) wired officer position, and two (2) wired crew positions in the chassis cab.

There shall be four (4) Firecom HM-10, model 107-0407-00, headset plug-in module

installed, one (1) for each wired position. Each module shall be designed for interior mounting and shall accommodate a Firecom single plug headset.

There shall be one (1) Firecom, model UH-51S, under the helmet, radio transmit headset provided, for the driver. The headset shall include a slotted earpiece, volume control, a noise canceling microphone, adjustable head strap, flex boom microphone, liquid foam ear seals, and a red push to talk button.

There shall be one (1) Firecom, model UH-51, under the helmet, radio transmit headset provided for the officer. The headset shall include, volume control, a noise canceling microphone, adjustable head strap, flex boom microphone, liquid foam ear seals, and a red push to talk button.

There shall be two (2) Firecom, model UH-52, under the helmet, intercom only headsets provided, one (1) for each of the crew positions. The headsets shall include, volume control, a noise canceling microphone, adjustable head strap, flex boom microphone, liquid foam ear seals, and a momentary push and hold to talk button.

Each headset shall be complete with a hanger to hold the headset when not in use. The drivers and officer's hangers shall be mounted inboard of each position, and all hangers shall be located in the optimal position based on cab and seat configuration by OEM unless otherwise specified by customer.

RADIO INTERFACE

There shall be one (1) Firecom, model MR-XX, mobile radio interface cable supplied with the intercom system. The cable shall be radio specific and shall allow the Firecom intercom system to interface with the Motorola mobile radio system. The model of headsets used shall determine which personal shall have radio transmit ability.

UPPER ZONE A

There shall be one (1) Whelen Engineering Freedom, model FN72VLED, 72" LED lightbar installed on the chassis cab roof. The lightbar shall be equipped with eight (8) forward facing linear red LED, two (2) forward facing linear white LED, two (2) corner forward facing red LED, and two (2) side facing red LED lights.

The lightbar shall be equipped with clear lenses. All clear LED lights in the lightbar shall be deactivated in the Blocking Right of Way mode.

UPPER ZONE C

There shall be two (2) Whelen B6 LED Series rotating/warning beacons installed in Upper Zone C, high at the rear of the apparatus. The combination lights shall incorporate an L31 series beacon and a 700 series warning light in a polished aluminum housing.

The high profile beacons shall incorporate thirty two (32) Super-LEDs, an optic hard coated polycarbonate lens, and a metalized reflector with clear optic collimators. The hard coated lenses shall provide extended life/luster protection against UV and chemical stresses. The four (4) conformal coated PC boards shall provide additional protection
against environmental elements. The high profile beacons shall include 28 Scan-Lock™ patterns including four (4) simulated rotating patterns and synchronized features.

The lower level warning lights shall incorporate eight (8) Super-LEDs, an optic hard coated polycarbonate lens, and utilize a metalized reflector with integrated TIR hybrid optics for maximum output. The hard coated lenses shall provide extended life/luster protection against UV and chemical stresses. The conformal coated PC board shall provide additional protection against environmental elements. The self-contained warning lights shall have 14 Scan-Lock flash patterns including steady burn and hi/low power.

The L31 dome lenses shall be sealed to a die cast aluminum base with an “O” ring gasket assembly. The 700 series warning light lenses shall be fitted with foam in place gasket assembly to the die cast aluminum base to provide additional protection against environmental elements. The solid state beacon light shall be vibration resistant.

The upper LED beacon lights shall have red lenses and the lower 700 series LED' lights shall have amber lenses.

UPPER ZONE B/D SIDE WARNING LIGHTS

There shall be four (4) Whelen 600 Series Super-LED® lights with chrome-plated flange installed, two (2) each in Upper Zone B and Upper Zone D. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The conformal coated PC board and sealed lens/reflector assembly shall provide additional protection against environmental elements. The solid state warning lights shall be vibration resistant.

The lights shall be red with clear lenses.

LOWER ZONE WARNING LIGHT PACKAGE

There shall be four (4) Whelen 600 Series Super-LED® lights with chrome-plated flange installed in the lower zone of the apparatus to meet NFPA compliance. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The conformal coated PC board and sealed lens/reflector assembly shall provide additional protection against environmental elements. The solid state warning lights shall be vibration resistant.

The lower zone warning lights shall all have red LED's and clear lenses.

TRAFFIC ADVISOR™

There shall be one (1) Whelen model TAL65 LED Traffic Advisor™ installed on the apparatus. The traffic directional light shall contain six (6) medium intensity LED lamps in a black low profile flat style housing.

There shall be a Whelen, model TACTLD1 traffic advisor control head provided with the Traffic Advisor™. The control head shall be housed in a rugged extruded aluminum case and shall offer eight programmable sequence flash patterns.

The traffic directional light shall be recess mounted in the rear of the body.

AIR HORN – PUMP PANEL

There shall be one (1) air horn button provided on the driver's side pump panel. The button shall be red in color and included a label reading "AIR HORN".

MECHANICAL SIREN

There shall be one (1) Federal Q2B-P pedestal mount mechanical siren provided on the front bumper. There shall be a siren brake control installed inside the chassis cab.

The siren shall be pedestal mounted on the outboard driver's side of the extended bumper gravel shield.

The siren shall be controlled be two (2) foot switches, one (1) on the driver’s side floor board and one (1) on the officer's side floor board.

FIRE RESEARCH 12V BROW-MOUNT SCENE LIGHT

There shall be one (1) Fire Research Evolution LED brow mount light installed on the apparatus. The light shall utilize a brow mounting bracket that shall attach to the lamphead and be custom to conform to the roof radius. Wiring shall extend from a weatherproof strain relief at the rear of the lamphead.

The lamphead shall have eight (8) ultra-bright white LEDs. It shall operate at 12 volts DC, draw 13/6.5 amps, and generate 15,000 lumens of light. The lamphead shall direct 50 percent of the light onto the action area while providing 50 percent to illuminate the working area. The lamphead shall be no more than 3-1/2" high by 12" wide. The lamphead and mounting bracket shall be powder coated white. The light shall be for fire service use.

The light shall be located on the front face of the chassis in the center.

The 12 volt front scene light(s) shall be controlled by a switch located in the chassis cab. The switch shall have an indicator that shall illuminate when the switch is in the

“ON” position. The light(s) shall be controlled by one (1) switch. The switch shall be labeled "FRONT SCENE."

FIRE RESEARCH 12V SURFACE-MOUNT SCENE LIGHTS

There shall be two (2) Fire Research Spectra LED series, model SPA900-Q70, surface mount lights installed on the apparatus. Each light shall be mounted with four (4) screws to a flat surface. They shall be 6 3/4" high by 9" wide and have a profile of less than 1 3/4" beyond the mounting surface. Wiring shall extend from a weatherproof strain relief at the rear of the lamphead.

Each light shall have twenty-four (24) white LEDs. They shall each operate at 12/24 volts DC, draw 6/3 amps and generate 7000 lumens of light. The lens shall redirect the light along the vehicle and out onto the working area. Each lamphead housing shall be aluminum with a chrome colored bezel.

The two (2) lights shall be installed onn the forward side face of the apparatus body, one (1) on the each side.

The driver's side and officer's side scene light(s) shall each be controlled by a rocker switch located in the chassis cab, for a total of two (2). The activation for the driver's side scene lights on the V-Mux display shall be labeled "LEFT SCENE" and the officer's side shall be labeled "RIGHT SCENE."

FIRE RESEARCH 12V SURFACE-MOUNT SCENE LIGHTS

There shall be two (2) Fire Research Spectra LED series, model SPA900-Q70, surface mount lights installed on the apparatus. Each light shall be mounted with four (4) screws to a flat surface. They shall be 6 3/4" high by 9" wide and have a profile of less than 1 3/4" beyond the mounting surface. Wiring shall extend from a weatherproof strain relief at the rear of the lamphead.

Each light shall have twenty-four (24) white LEDs. They shall each operate at 12/24 volts DC, draw 6/3 amps and generate 7000 lumens of light. The lens shall redirect the light along the vehicle and out onto the working area. Each lamphead housing shall be aluminum with a chrome colored bezel.

The two (2) lights shall be installed on the rear side face of the body, one (1) on each side.

The driver's side and officer's side scene light(s) shall each be controlled by a rocker switch located in the chassis cab, for a total of two (2). The activation for the driver's side scene lights on the V-Mux display shall be labeled "LEFT SCENE" and the officer's side shall be labeled "RIGHT SCENE."

FIRE RESEARCH 12V SURFACE-MOUNT SCENE LIGHTS

There shall be two (2) Fire Research Spectra LED series, model SPA900-Q70, surface mount lights installed on the apparatus. Each light shall be mounted with four (4) screws to a flat surface. They shall be 6 3/4" high by 9" wide and have a profile of less than 1 3/4" beyond the mounting surface. Wiring shall extend from a weatherproof strain relief at the rear of the lamphead.
Each light shall have twenty-four (24) white LEDs. They shall each operate at 12/24 volts DC, draw 6/3 amps and generate 7000 lumens of light. The lens shall redirect the light along the vehicle and out onto the working area. Each lamphead housing shall be aluminum with a chrome colored bezel.

The two (2) lights shall be installed on the rear face of the body, one (1) on each side.

The 12 volt rear scene light(s) shall be controlled by a switch located in the chassis cab. The switch shall have an indicator that shall illuminate when the switch is in the “ON” position. The light(s) shall be controlled by one (1) rocker switch. The switch shall be labeled "REAR SCENE."

In addition to the switch located in the cab, the 12 volt rear scene light(S) shall be activated by the rear work light switch and when the apparatus is placed in reverse.

FIRE RESEARCH 12V TELESCOPING SCENE LIGHTS

There shall be two (2) Fire Research Spectra LED series, model SPA530-Q20, side mount push up telescopic lights installed on the apparatus. Each light pole shall be anodized aluminum and have a knurled twist lock mechanism to secure the extension pole in position. Each extension pole shall rotate 360 degrees. Each outer pole shall be a grooved aluminum extrusion and qualify as an NFPA compliant handrail. Each pole shall have offset mounting brackets. Wiring shall extend from each pole bottom with a 4' retractile cord.

Each lamphead shall have eighty four (84) ultra-bright white LEDs, 72 for flood lighting and 12 to provide a spot light beam pattern. They shall each operate at 12/24 volts DC, draw 18/9 amps, and generate 20,000 lumens of light. Each lamphead shall have a unique lens that directs flood lighting onto the work area and focuses the spot light beam into the distance. Each lamphead angle of elevation shall be adjustable at a pivot in the mounting arm and the position locked with a round knurled locking knob. Each lamphead shall be no more than 5 3/8" high by 14" wide by 3 3/4" deep and have a heat resistant handle. The lampheads and mounting arms shall be powder coated. The LED scene lights shall be for fire service use.

The lights shall be located on the rear of the chassis cab, one (1) on each side.

Each light shall be controlled at the pump panel with it's own individual switch.

BODY PAINT PREPARATION

After the body and components have been fabricated and assembled they then shall be disassembled prior to painting so when the apparatus is completed there shall be finish paint beneath the removable components. The apparatus body and components shall be metal finished as follows to provide a superior substrate for painting.

All aluminum sections of the body shall undergo a thorough cleaning process starting with a phosphoric acid solution to begin the etching process followed by a complete rinse. The next step shall consist of a chemical conversion coating applied to seal the metal substrate and become part of the aluminum surface for greater film adhesion.

After the cleaning process, the body and its components shall be primed with a High Solids primer and the seams be caulked.
All bright metal fittings, if unavailable in stainless steel or polished aluminum, shall be heavily chrome plated. Iron fittings shall be copper under plated prior to chrome plating.

PAINT PROCESS

The paint process shall follow the strict standards as set forth by PPG Fleet Finish Guidelines.

The body shall go through a three-stage paint process: primer coat, base coat (color), and clear coat. In the first stage of the paint process the body shall be coated with PPG F3980 Low VOC / High Solids primer to achieve a total thickness of 2-4 mills. In the second stage of the paint process the body shall be painted with PPG FBCH Delfleet™ High Solids Polyurethane Base Coat. A minimum of two to three coats of paint shall be applied to achieve hiding. In the final stage of the paint process the body shall be painted with PPG DCU-2002 Clear Coat. A minimum of two to three coats shall be applied to achieve a total dry film thickness of 2-3 mills.

As part of the curing process the painted body shall go through a Force Dry / Bake Cycle process. The painted components shall be baked at 185 degrees for 3 hours to achieve a complete coating cure on the finished product.

HAND POLISHED

After the Force Dry / Bake Cycle and ample cool down time, the coated surface shall be sanded using 3M 1000, 1200, and or 1500 grit sandpaper to remove surface defects. In the final step, the surface shall be buffed with 3M super-duty compound to add extra shine to coated surface. No more than .5 mil of clear shall be removed in this process.

BODY COLOR

The body shall be painted with PPG High Solids Polyurethane Base Coat. The single tone body shall be painted red to match customer fleet.

UNDERCOATING

The apparatus shall undergo a two (2) step undercoating process. The first step shall be a rubberized polyurethane base compound that is applied after the body has been primed. The materials used incorporate unused paint products to reduce the amount of waste released into the environment. This coat shall be applied to all hidden pockets and surfaces that shall not be visible after completion.

As a final step, the entire underside of the body shall be coated with a bituminous based automotive type undercoating when the apparatus is completed. During this application, special care shall be taken to avoid spraying the product on air lines, cables, or other items that would cause normal maintenance to be hindered.

CORROSION PREVENTION

One (1) 3.75 ounce tube of Electrolysis Corrosion Kontrol (ECK) shall be provided to use whenever additional items are mounted to the apparatus.

ECK protects aluminum and stainless steel against electrolytic reaction, isolates dissimilar metals and gives bedding protection for hardware and fasteners. ECK contains anti-seizing lubricant for threads. ECK is dielectric and perfect for use with electrical connectors.

TOUCH UP PAINT

One (1) two ounce bottle of acrylic enamel touch-up paint or two (2) touch up paint pens, if color is available, shall be supplied.

2" REFLECTIVE LETTERING

There shall be up to one hundred (100) reflective letters provided and installed on the apparatus. The letters shall be approximately 2" tall with black outline and shadow.

3" REFLECTIVE LETTERING

There shall be up to one hundred (100) reflective letters provided and installed on the apparatus. The letters shall be approximately 3" tall with black outline and shadow.

4" REFLECTIVE LETTERING

There shall be up to ten (10) reflective letters provided and installed on the apparatus. The letters shall be approximately 4" tall with black outline and shadow.

REFLECTIVE STRIPE FRONT TERMINATION

The NFPA reflective stripe located on the side of the apparatus shall wrap around the front of the chassis cab and terminate at chassis grill.

RUB RAIL REFLECTIVE STRIPING

There shall be 2" reflective striping installed in the rub rail channel. The reflective striping shall be diamond grade quality material for increased visibility. The reflective shall be silver in color.

NFPA COMPLIANT REFLECTIVE STRIPING

Reflective striping shall be applied to the exterior of the apparatus in a manner consistent with NFPA 1901. It shall consist of a 1", 4", and a 1" wide stripe low across the front of the chassis and along the sides up to the first compartment on each side where it shall transition to a point in the upper compartments where it then shall run level to the back edge of the body. There shall be a 1" gap provided between each of the stripes.

There shall be a reflective "Z" located in the reflective striping on each side of the apparatus where the stripe transitions from low to high.

The color of the upper reflective striping on the apparatus shall be gold.

The color of the accent located on the upper reflective striping on the apparatus shall be black.

The color of the main reflective striping on the apparatus shall be white.

The color of the accent located on the main reflective striping on the apparatus shall be black.

The color of the lower reflective striping on the apparatus shall be gold

The color of the accent located on the lower reflective striping on the apparatus shall be black.

CHEVRON COLOR - RED/FLUORESCENT YELLOW-GREEN

The chevron striping shall consist of 3M part numbers 1172 EC, red and 3983, fluorescent yellow-green.

Only 3M Diamond Grade™ VIP Reflective Striping shall be used. 3M Diamond Grade™ VIP Reflective Striping is a wide angle prismatic lens reflective sheeting designed for the production of durable traffic control signs and delineators that are exposed vertically in service. This sheeting is designed to provide higher sign brightness than sheetings that use glass bead lenses. It is intended to also provide high sign brightness in the legibility distance where other sheetings do not.

CHEVRON REFLECTIVE STRIPING ON REAR

In addition to the custom striping pattern supplied on the apparatus, there shall be additional reflective striping applied to the entire rear of the unit. The reflective striping shall cover at least 50% of the rear facing vertical surface per NFPA 1901. The striping shall consist of a solid base layer of reflective material and alternate between the exposed base layer material and durable, transparent, acrylic colored film. Each stripe shall be a minimum of 6" in width and shall be applied to the apparatus at 45° angle.

The chevron pattern shall include the any other painted storage compartment doors. The T1 Compartment shall be excluded from the chevron pattern.

VEHICLE LETTER PLACARDS AND HOLDERS

There shall be four (4) placard identification holders located on the apparatus. Placard Holders are Brady model #60141.

CUSTOM DECALS

There shall be two (2) reflective 14” custom decals located on the cab door(s).

There shall be one (1) reflective 14” custom decals located on the rear compartment door.

The Gross Axle Weight Rating (GAWR) and the Gross Combined Weight Rating (GCWR) or Gross Vehicle Weight Rating (GVWR) of the chassis shall be adequate to carry the weight of the unequipped apparatus with the water tank and other tanks full, specified hose load, unequipped personnel weight, ground ladders, and miscellaneous equipment allowance of 3,000 pounds.

CAB AND CHASSIS WARRANTY

Summary of Warranty Terms:

THE FOLLOWING IS SUMMARY OF WARRANTY TERMS FOR INFORMATION ONLY. THE ACTUAL LIMITED WARRANTY DOCUMENT, WHICH IS ATTACHED TO THIS OPTION, CONTAINS THE COMPLETE STATEMENT OF THE SPARTAN CHASSIS, INC. LIMITED WARRANTY. SPARTAN’S RESPONSIBILITY IS TO BE ACCORDING TO THE TERMS OF THE COMPLETE LIMITED WARRANTY DOCUMENT.

The chassis manufacturer shall provide a limited parts and labor warranty to the original purchaser of the custom built cab and chassis for a period of twenty-four (24) months, or the first 36,000 miles, whichever occurs first. The warranty period shall commence on the date the vehicle is delivered to the first end user.

TWO (2) YEAR PROTECTION PLAN - MATERIAL AND WORKMANSHIP WARRANTY

OEM installed purchased parts and fabricated parts shall be free of defects in material and workmanship for a period of two (2) years starting thirty (30) days after the original invoice date. For further details, please refer to the complete warranty document.

WATER TANK WARRANTY

The tank shall be complete with a lifetime warranty. The tank manufacturer shall mark the tank and furnish notice that indicates proof of warranty. For further details, please refer to the complete warranty document.

PUMP WARRANTY

The fire pump shall be warranted by Waterous for a period of five (5) years from the date of delivery to the fire department or five and one-half (5-1/2) years from the shipment date by Waterous, whichever period shall be first to expire. For further details, please refer to the complete warranty document.

The apparatus, when fully equipped and loaded, shall be capable of the following performance while on dry paved roads that are in good condition:

- From a standing start, the apparatus shall be able to attain a speed of 35 mph (55 kmph) within 25 seconds on a level road.
- The apparatus shall be able to attain a minimum top speed of 50 mph (80 kmph) on a level road.
- The apparatus shall be able to maintain a speed of at least 20 mph (30 kmph) on any grade up to and including 6 percent.
- The maximum top speed of the apparatus shall not exceed the tire manufacturer's maximum speed rating for the tires installed on the apparatus.

In the event the apparatus fails to meet the test requirements of these specifications on the first trials, second trials may be made at the option of the bidder within 30 days of the date of the first trials.

Such trials shall be final and conclusive and failure to comply with these requirements shall be cause for rejection. Failure to comply with changes as required to conform to any clause of the specifications within 30 days after notice is given to the bidder of such changes, shall be cause for rejection of the apparatus.

Permission to keep or store the apparatus in any building owned or occupied by the Department during the specified period, with the permission of the bidder, shall not constitute acceptance. No Exceptions