



Arizona Fire District
Anywhere Arizona, AZ
Type III Engine Specification

Updated: 10-22-19

Intent of Specifications

It shall be the intent of these specifications to cover the furnishing and delivery of a complete Type III Engine apparatus to **Arizona Fire District**. The apparatus shall be equipped as specified as follows in these specifications. These specifications only cover the general construction requirements, equipment, appliances and certain details to finish as to which the successful bidder must conform. Minor details of construction and materials, which are not otherwise specified, are left to the discretion of the successful bidder, who shall be solely responsible for the design and construction of all features. The apparatus proposed by the bidders shall meet the requirements of the National Fire Protection Association (NFPA), Department of Transportation (DOT), Federal Motor Vehicle Safety Standards (FMVSS) and Society of Automotive Engineers (SAE) as stated in the current edition at the time of construction.

Warranties

The apparatus shall be warranted and free from defects in materials and workmanship under normal use and service for a period of one (1) year on the complete apparatus. Apparatus body components shall be warranted from the individual component's manufacturer.

Body: There shall be a 10-year or 100,000-mile warranty on the structural integrity of the apparatus body to the original purchaser. There shall be a copy of the body warranty provided with the completed apparatus at delivery.

Paint/Corrosion: The apparatus shall be supplied with a seven (7) year paint and corrosion warranty from the delivery date of the apparatus.

Plumbing: The apparatus shall be supplied with a ten (10) year plumbing warranty from the delivery date of the apparatus.

Tank: The tank shall have a lifetime warranty provided from the tank manufacturer.

Pump: The fire pump shall have a five (5) year standard warranty provided by the WS Darley Company.

Chassis: The apparatus chassis will be provided with a warranty through the chassis builder.

Chassis Modifications

Chain on Key

There shall be a chain installed onto the ignition key of the apparatus.

Aluminum Map Box

There shall be a custom designed center console and map box installed in the cab of the apparatus. The main apparatus electrical panel shall be located within the console with an access panel to ease in access. The panel area of the console shall be where the emergency switches and controls for accessory items will be located. The map box shall be toward the rear of the console designed with three (3) map slots with the approximate dimensions of 3" wide x 20" long x 12 ¼" deep. The map box and control console shall be constructed from aluminum diamond plate with a black vinyl top panel.

SCBA Brackets

There shall be four (4) Superior Flamefighter Corporation "one size fits all" NFPA compliant SCBA brackets installed in the cab SCBA seats. The brackets shall be bolted into the cab seat backs and shall be supplied with the NFPA compliant collision restraint strap for crew compartment seating locations.

Front Bumper Extension

There shall be a front bumper extension provided on the chassis, which shall extend out the bumper approximately 21" in length. The extension shall be built off the chassis frame. There shall be an aluminum diamond plate gravel shield bolted to the framework to cover the front bumper extension. The chassis front tow hooks shall also be moved out with the bumper to the extended position.

Bumper Compartments and Covers

There shall be two (2), recessed compartments located in the front bumper extension with drain holes in the corners at the outside of the frame rails lined with compartment matting. There shall be one (1) open area at the center of the bumper extension for a permanent mounted winch. There shall be a sealed aluminum diamond plate cover installed for the center over the winch and black nylon netting for the side hose wells. The center cover shall be attached at the rear of the opening with a stainless-steel hinge and supplied with a push button trigger latch. The cover shall also be supplied with pneumatic lift assist to hold the cover open when in use.

Winch

There shall be a Warn model 16.5ti, 16,000lb pound winch supplied and installed in the front bumper of the apparatus upon delivery. The winch shall come with a 4-way roller, 90' of 7/16" aircraft grade wire rope, and hook. A remote-controlled lead will also be supplied for controlling the winch.

Undercab Compartments

There shall be compartments fabricated from aluminum diamond plate and mounted under the crew cab portion of the apparatus cab. The compartments will be fabricated as large as practical

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within the space provided and will be equipped with a vertically hinged swing open flat door with weatherstrip and latch. There shall be a LED light installed in each compartment with a switch on the lighthouse for activation.

Kussmaul Auto Eject

There shall be a Kussmaul Super Auto Eject installed and wired as the chassis shoreline. The shoreline shall be plugged into the Auto Eject and upon activation of the chassis starter the shoreline shall automatically be ejected from the vehicle. The Auto Eject shall have a weather tight enclosure to prevent corrosion and malfunction.

Battery Conditioner/Charger

There shall be a Kussmaul Auto Charge 1000 battery charger installed on the vehicle. The battery charger shall keep the batteries at a charged and ready state. The conditioner shall also be wired to the vehicle's shoreline inlet. There shall be a remote indicator to show charging state of the batteries.

Air Eject

There shall be a Kussmaul Air Eject installed on the vehicle on the cab near the driver's door area and plumbed to the chassis air system. The Air Eject shall keep the vehicles air brake system at a charged and ready state. The Air Eject shall be automatically disconnected when the vehicle's starter is activated. The air eject shall also be supplied with the weatherproof adapter kit.

USB Ports

There shall be a Kussmaul model 091-219-4 dual port 12-volt USB power/charging port installed in the master switch panel in the cab of the apparatus. The dual port module will be supplied with two (2) 2.1-amp USB outlets that are powered by the chassis 12-volt electrical system.

12 Volt Power Wire

There shall be one (1) set of spare 12-volt wires located in the cab of the apparatus near the electric control console and shall be master battery switched wires. The wires shall be labeled by the manufacturer and this wire shall be used for radio installation at a later date by the radio installation company.

120-Volt Receptacle

There shall be one (1) 120-volt/15-amp duplex household style receptacle installed in the cab of the apparatus on the center control console. The receptacles shall be wired to the shoreline inlet for operation.

Radio Antenna

There shall be one (1) two-way radio antenna installed through the roof of the chassis cab towards the rear. The antenna shall be customer supplied and delivered with the customer's chassis for installation.

Chassis Exhaust

The chassis exhaust shall be properly extended with exhaust pipe, elbows, and clamps to a position directly ahead of the right rear wheel.

Mudflaps

There shall be heavy-duty rubber mudflaps installed behind each front and rear wheel.

Tow Eyes

There shall be a set of tow eyes at the rear of the body just under the rear step. The tow eyes shall be made from 3/4" x 4" steel with a 2" x 4" oval eye center. They shall be bolted to a heavy-duty steel frame work that is attached to the chassis framerails with Grade 5 bolts. The tow eyes shall be finish painted black.

Helmet Security

Helmet storage shall be customer supplied and installed.

Tire Pressure Monitoring System

There shall be a tire pressure monitoring system installed on each of the apparatus wheels to monitor the air pressure in each wheel. The sensor shall be a valve stem mounted device, similar to a valve stem cap, manufactured from chrome plated brass material.

The sensor shall be set to the tire pressure of the wheel when installed onto the wheels valve stem for pressure ratings up to 120PSI.

Fire Pump

Pump Test

The pump shall be tested to NFPA standards at the manufacturer's pump test location by an independent third-party company before delivery of the completed apparatus. A copy of the pump test shall be provided to the department and a stamped plate shall be installed on the operator's panel indicating the pump test ratings, pressures, and RPM's. The pump shall be tested at the following capacities:

- 750 GPM @ 150 PSI
- 750 GPM @ 165 PSI
- 525 GPM @ 200 PSI
- 375 GPM @ 250 PSI

Darley KSP 750GPM Fire Pump Specification

A Darley model KSP 750 single stage, centrifugal, PTO driven fire pump shall be provided and installed. Pump shall be a two gear.

Power to drive the pump shall be provided by the same engine used to propel the apparatus. The pump shall be midship mounted and designed to operate through a PTO. The pump is to be

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placed in gear from the chassis cab. Pump shift to be clearly labeled. The PTO and gear ratios are to be selected so as to provide good performance in "pump and roll".

Pump to be placed in gear from chassis cab. Pump shift to be clearly labeled. PTO and gear ratios are to be selected so as to provide good performance in "pump and roll" operation.

Pump Shaft

Pump shaft to be precision-ground stainless steel with long-wearing Chromium Oxide hard coating under the packing glands with a hardness level of #RC72. The pump shaft shall be splined to receive broached impeller hubs, for greater resistance to wear, torsional vibration, and torque imposed by engine, as well as ease of maintenance and repair

The bearings shall be heavy duty, deep groove, and radial-type ball bearings oversized for long life. Sleeve bearings on any portion of the pump or transmission shall be prohibited due to wear, deflection, and alignment concerns. Bearings to be protected at all openings from road dirt and water splash with oil seals and water slingers.

Impeller

The impellers shall be high-strength bronze alloy of mixed flow design, splined to the pump shaft for precision fit, durability, and ease of maintenance. Impeller shall be vacuum cast designed for maximum lift and highest capacity. The seal rings shall be renewable, double labyrinth, wrap around bronze type.

Impeller shaft oil seals shall be constructed to be free from steel components except for the internal lip spring. The impeller shaft oil seals shall carry a lifetime warranty against damage from corrosion from water and other fire-fighting fluids.

Pump Transmission

The transmission case shall be heavy duty cast iron. A magnetic drain plug shall be provided. Transmission case interior shall be powder coated to reduce oil contamination. Transmission case shall be equipped with a removable plate for quick inspection of gears, shafts, and bearings inside the transmission. The pump ratio shall be selected by the manufacturer's engineering department. Gears shall be helical in design and precision ground for quiet operation and extended life. Gears to be cut from high strength alloy steel, ground, and carburized. Chain drive and/or design requiring extra lubricating pump is not acceptable.

Pump casing shall be of ductile iron vertically split, with a minimum tensile strength of 65,000 PSI - bronze-fitted. Pump drive shaft shall be precision-ground, heat-treated alloy steel-minimum 1-1/2" x 10-spline ends.

Electric Primer

The fire pump priming system shall consist of one (1) 12V positive displacement type rotary vane primer of a fluidless design. A single, push-pull control shall be located on the pump operator's panel with a "Pull to Prime - Push To Close" label. The primer shall not require a lubrication tank. The priming pump shall be constructed of heat treated aluminum and hard coat anodized.

Pump Shift

The pump shall be operated off of a hot shift Chelsea PTO. The PTO shall be mounted directly to the chassis transmission with a tubular drive shaft connecting the PTO to the water pump for operation. The PTO shall be activated in the cab by a rocker type switch.

*NOTE: The truck MUST be capable of pump and roll operations.

Drive Lines

The drive lines shall be properly fit with the pump installation. Tube shall be DOM (drawn over mandrel) made for drive shafts.

They shall be electronically MIG welded by a certified welder on a specially designed drive shaft fabrication machine. After welding, the drive shaft shall be checked for straightness and be dynamically balanced by computerized machinery. All drive shafts shall be balanced.

Suction Relief Valve

A Task Force Tips (TFT) 2 1/2" suction side relief valve shall be provided and piped toward the ground under the apparatus. Rugged, cast aluminum construction with hard coat anodized and powdercoat finish for maximum corrosion resistance. Fully adjustable from 90 to 300 psi. Complies with NFPA 1901.

Foam System

FoamPro 1600 Foam Injection System

A FoamPro 1600 direct injection foam system shall be installed. The systems shall have a rated capacity of 850 gpm of foam/water solution at .2% foam concentration, 340 gpm at .5% concentration and 170 gpm at 1.0% concentration.

The foam system shall be capable of discharging Class "A" foam only.

The foam proportioning system operation shall be based on a direct measurement of water flows and pressure. The system shall be equipped with a control module on the pump control panel. Incorporated within the control display shall be a microprocessor, which receives input from the system flow meter while also monitoring the foam concentrate output. The microprocessor shall compare the values of the water flow versus the foam flow, to ensure that the proportion rate is accurate.

Push button control for the foam-proportioning system rate shall allow a ratio from 0.1% to 1.0% in 0.1% increments.

The foam injection pump shall be a positive displacement type rated at 1.7 gpm and powered by a 12-volt DC electric motor.

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A check valve shall be installed between the water pump and the foam injection point to prevent foam agent from contaminating the water pump. Also, a check valve shall be placed between the foam pump and injection point to prevent water flowing into the foam pump and foam tank.

The foam system shall be plumbed from a 2" discharge opening on the pump with a 2" pipe and a 2" "Tee" for the flow meter sending unit and foam injector. After the flow meter and the foam injection point the discharge shall be split to feed the specified discharges.

*Note: The foam system will be plumbed to the two (2) hose reels and the two (2) front bumper discharges.

PLUMBING

Pump Plumbing

The apparatus will be plumbed using stainless steel pipe and stainless-steel fittings. High-pressure rubber hose may be used when needed for discharges only. Victaulic couplings shall be used wherever needed to prevent vibration damage to the pump, plumbing and water tank. The suction and discharge piping of the pump shall include victaulic fittings for easy maintenance of the pump and plumbing when needed.

Suction Inlet

There shall be one (1) 5" non-gated suction inlet with 5" threads and long handle chrome caps at the driver's side of the apparatus pump panel.

2 ½" Auxiliary Inlet

There shall be one (1) 2 ½" NST gated suction inlet provided at the driver side of the apparatus pump module. The valve shall be an Akron quarter turn ball valve controlled with a direct mount chrome control at the pump operator's panel. A strainer, chrome plug and chain will also be provided with the inlet.

There shall be one (1) ¾" bleeder/drain supplied for the inlet.

Direct Tank Fill

There shall be one (1) direct tank fill located at the rear panel of the apparatus as low as possible at a location to be determined. The fill shall be a 2 ½" Akron Brass quarterturn ball valve with chrome plated control at the valve. The fill shall terminate with a 2 ½" NST female swivel with plug.

A bleeder drain shall be installed on the outboard side of the fill valves for relieving the water pressure from the fill hose when filling is completed. The water shall be directed under the apparatus body away from stepping surfaces with either hose or plastic tubing through the rear panel to "hide" the hose or tubing from plain view.

Crosslay

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There shall be one (1) single stack style crosslay hose bed provided directly above the pump operator's panel at the front of the pump module. The crosslay shall be capable of holding 200' of double jacket fire hose and will be able to be deployed off each side of the apparatus using a mechanical chicksan swivel. There shall be stainless steel scuffplates around the crosslay hose feed out to protect the surface from hose that is being deployed. A perforated aluminum crosslay floor shall be installed to allow drainage and air flow around the crosslay.

The crosslay shall be plumbed with 2" stainless steel pipe and a 2" Akron quarter turn ball valve controlled at the pump panel with a chrome-plated Innovative Controls locking control handle. The discharge shall be terminated with a 1 1/2" NST male threaded swivel for connection of 1 1/2" or 1 3/4" fire hose.

There shall be one (1) 3/4" bleeder/drain supplied for each discharge.

There shall be a black nylon webbing installed over the ends of the crosslay hose bed with quick-release buckles for quick easy access to the hose and nozzle. The webbing shall prevent accidental deployment of the hose and nozzle.

Booster Hose Reel

There shall be two (2) Hannay, model EF16.5-30-31, electric rewind booster hose reels supplied and installed at the top of the pump module, one (1) each side, to the rear of the crosslay. There shall be a rewind button installed for actuation at each side of the pump module. Each of the reels shall be plumbed with a 1" Akron quarter turn ball valve and 1" stainless steel plumbing or high-pressure hose. There shall be two (2) stainless steel roller/guide assemblies installed one (1) each side at the top edges of the pump module to aide in deploying and respooling the booster hose, this shall also help protect the hose during this process from getting damaged. There shall be 100' of 1" Yellow lightweight booster hose supplied on each reel upon completion.

Side 2 1/2" Discharges

There shall be two (2) 2 1/2" discharges, one (1) at the driver side pump panel and one (1) at the passenger side pump panel. Each discharge will be plumbed with 2 1/2" stainless steel pipe and a 2 1/2" Akron quarter turn ball valve controlled at the valve with a chrome plated manual control handle. The 30-degree discharge elbow shall be part of the valve and will be equipped with a 2 1/2" x 1 1/2" reducer with 1 1/2" cap with chain.

Each discharge will have a 3/4" bleeder/drain at the plumbing low-point with control piped toward the ground.

Front Bumper Discharge

There shall be two (2) 1 1/2" discharges plumbed to the front bumper of the apparatus, one (1) each side to the immediate outside of the frame extensions near the front. The discharges shall be plumbed with 2" stainless steel pipe or flexible pipe, high-pressure hose, and terminating at the top of the bumper with a 2" x 1 1/2" Mattydale discharge swivel. The discharge valve shall be behind the bumper with access to the valve handle. The valves shall be Akron 2" quarter turn ball

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valves controlled with a valve mounted chrome plated control handle. The valve and swivel shall be painted job color.

There will be a 1 ½" FNST x (2) 1 ½" MNST gated wye with caps supplied on each discharge swivel. There will also be a stop installed to the rear of the swivels to prevent the swivels from going past 90-degrees toward the cab grille/hood which could possibly damage the grille and hood assembly.

There shall be one (1) ¾" automatic bleeder/drain supplied for the discharge at the low point of the plumbing.

2 ½" Rear Discharges

There shall be two (2) 2 ½" discharges plumbed to the rear panel of the apparatus. The valves shall be located at the rear panel and will be Akron quarter turn ball valves controlled at the valve with chrome plated handles. The discharges shall terminate with a 2 ½" chrome cap and chain. There shall be one (1) each side at the rear of the apparatus body.

There shall be one (1) ¾" bleeder/drains supplied for each discharge at the plumbing low-points near the pump.

Master Drain

There shall be one (1) manifold type master drain, to drain pump and lines toward the ground.

Individual Line Drains/Bleeders

There shall be an Innovative Controls chrome-plated ¾" "lift up/push down" drain provided for each 1 ½" or larger discharge and 2 ½" or larger inlet. The purpose of these drains is to aide firefighters in draining the pump or to bleed off water to help remove a hose from the apparatus that had water pressure. The drains shall be located on each side of the apparatus near the bottom of the pump house directly above the side running boards. These drains shall be identified with color-coded name labels to match the discharge or inlet that it is for.

The automatic drain(s) shall be Class 1 34AD drains.

3/8" Cooling Line

There shall be a 3/8" pump cooling/recirculation line plumbed from the pump to the water tank for pump cooling purposes. There shall be a chrome plated ¼ turn valve located on the pump operator's panel for activating the cooling line. This line shall be properly labeled to its function at the time of delivery.

Tank Fill (Pump to Tank)

There shall be one (1) pump to tank line for filling the water tank with the pump with a 1 ½" line. The valve shall be an Akron quarter turn ball valve with an Innovative Controls push-pull locking control handle at the pump panel.

Tank to Pump

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There shall be one (1) tank to pump line 3" in size with a check valve. The valve shall be an Akron 3" quarter turn ball valve equipped with an Innovative Controls push-pull locking control handle at the pump panel. A flexible line shall be used between the tank sump and the valve.

Pump House & Operators Panel

Pump House

Apparatus body shall be divided into two (2) individual sections to increase body flexibility for the severe use in firefighting applications. There shall be a separate pump compartment with control panel and the rear water tank and compartment body. The pump house will also be built separate from the cab for the increase of flexibility. The unit will be a welded stainless-steel structure using both formed and structural stainless-steel pieces to provide a pump compartment and pump control module.

Pump Module Compartment

There shall be a compartment installed at the passenger side of the pump module. The compartment shall be recessed in the rear portion of the module in a vertical orientation. The dimensions of the compartment shall be approximately 61" high x 16 ½" wide x 18 ½" deep. The compartment shall have a vertically hinged door with latching hardware and door check.

Pump Panels

The pump panels shall be brushed stainless-steel and shall be easily removable for service work. The left panel shall have a hinged gauge panel also made of brushed stainless-steel located directly above the lower side pump panel. The upper and lower left panels shall be where all pump controls and gauges shall be placed and all controls and gauges shall be labeled using color-coded name labels.

The passenger side, lower side panel, shall be attached with four (4) push button trigger latches, one (1) in each corner, for quick, easy removal. The right panel shall also have a quick access door made of black vinyl covered aluminum located directly above the lower panel for access to the pump. The upper panel shall be hinged at the top and shall be held open with pneumatic door lifts. Upon removal of the lower panel and opening the upper door it shall allow access into the pump compartment without any obstructions, minus plumbing and plumbing components.

Pump Panel Lighting

Pump panel lighting shall consist of four (4) Tecniq LED pump panel lights, three (3) at the left side and one (1) at the right side of the apparatus for complete illumination of the pump operator panel. The lights shall be controlled at the pump operator's panel with an "On/Off" toggle switch. The lights shall be housed in a brushed stainless-steel full width lamp shield above the gauge panel. The center light at the left side shall be activated with the pump shift and shall only light up if the pump shift was successful.

Operators Panel

The following items shall be furnished on the operator panel:

-One (1) 4 ½" white master pressure gauge, liquid filled 0-400 PSI

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- One (1) 4 ½" white master vacuum gauge, liquid filled 30"-0-400 PSI
- One (1) 2 ½" white pressure gauge one (1) per 1 ½" or larger discharge 0-400PSI
- One (1) Fire Research Pump Boss Pressure Governor
- One (1) Innovative Controls water level readout
- One (1) Innovative Controls foam level readout
- One (1) pump panel light switch
- One (1) pump primer control
- All discharge controls
- One (1) tank fill control
- One (1) 2 ½" gated suction control
- One (1) tank to pump control
- One (1) Master Drain control
- One (1) UL test outlet
- One (1) Pump Hourmeter
- One (1) FoamPro 1600 control head

Pressure Gauges

The gauges shall be Noshok stainless steel gauges that are fully filled with pulse and vibration dampening Interlube to lubricate the internal mechanisms to prevent lens condensation and to ensure proper operation to minus 40 degrees F. The Zytel nylon cases shall be temperature compensated with an internal breathing diaphragm to permit fully filled cases and to allow a rigid lens with a distortion free viewing area.

To prevent internal freezing and to keep contaminants from entering the gauge, the stem and Bourdon tube shall be filled with low temperature oil and be sealed from the water system using an isolating diaphragm located in the stem.

Individual 2 ½" line gauges for each 1 ½" or larger discharges shall be supplied and mounted adjacent to the discharge valve control handle. A chrome plated trim ring with color-coded inserts shall be supplied for each gauge.

Two (2) 4 ½" master pump gauges shall be supplied and mounted in close proximity to the throttle, primer, and engine instrumentation. The intake gauge shall be to the left of the discharge gauge. Chrome plated trim rings shall be supplied with each gauge.

Pressure Governor and Engine Monitoring Display

There shall be a Fire Research PumpBoss series PBA401-D00 pressure governor and monitoring display kit installed. The kit shall include a control module, intake pressure sensor, discharge pressure sensor, and cables. The control module case shall be waterproof and have dimensions not to exceed 6 ¾" high by 4 ⅝". The control knob shall be 2" in diameter with no mechanical stops, have a serrated grip, and a red idle push button in the center. It shall not extend more than 1 ¾" from the front of the control module. Inputs for monitored engine information and outputs for engine control shall be on the J1939 databus. Inputs from the pump discharge and intake pressure sensors shall be electrical.

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The following continuous displays shall be provided:

- Engine RPM; shown with four daylight bright LED digits more than 1/2" high
- Check engine and stop engine warning LEDs
- Engine oil pressure; shown on a dual color (green/red) LED bar graph display
- Engine coolant temperature; shown on a dual color (green/red) LED bar graph display
- Transmission Temperature: shown on a dual color (green/red) LED bar graph display
- Battery voltage; shown on a dual color (green/red) LED bar graph display
- Pressure and RPM operating mode LEDs
- Pressure / RPM setting; shown on a dot matrix message display
- Throttle ready LED.

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

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

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

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

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

The pressure governor and display shall be programmed to interface with a Cummins engine.

Water Tank Level Gauge

There shall be an Innovative Controls model 3030385-31, Ultra Bright LED Master Water level gauge readout provided on the pump operator's panel. The level gauge will contain at least fourteen (14) high intensity LED's on the display in an inverted "V" pattern allowing the full, $\frac{3}{4}$, $\frac{1}{2}$, $\frac{1}{4}$ and refill levels to be easily distinguished at a glance. The gauge shall use a pressure

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transducer installed near the bottom of the water tank to determine the correct volume in the tank. The readout will be provided with a single chrome plated housing.

Foam Tank Level Gauge-Class A

There shall be an Innovative Controls model 3030386-31A, Ultra Bright LED Master Class A Foam level gauge readout provided on the pump operator's panel. The level gauge will contain at least fourteen (14) high intensity LED's on the display in an inverted "V" pattern allowing the full, $\frac{3}{4}$, $\frac{1}{2}$, $\frac{1}{4}$ and refill levels to be easily distinguished at a glance. The gauge shall use a pressure transducer installed near the bottom of the water tank to determine the correct volume in the tank. The readout will be provided with a single chrome plated housing.

Discharge Controls

The apparatus shall be equipped with Innovative Controls chrome plated push-pull locking controls. The handles shall be chrome-plated zinc with a recessed area for identification label. The control shall be a $\frac{1}{4}$ turn locking in any position handle and the connecting rod shall be $\frac{1}{2}$ " stainless steel linkage rods equipped with ball swivels for ease in operation.

Heat Exchanger

A Sen-dure model #1212-1 auxiliary booster cooler shall be installed on the apparatus made of brass and copper construction. The unit shall permit use of water from the discharge side of the pump for cooling of the coolant circulating through the engine cooling system with out intermixing. The auxiliary cooler lines shall be routed away from the engine exhaust and be properly secured to the apparatus.

Booster Tank

(The booster tank shall have a No Fault All Out Lifetime warranty through the tank manufacturer.)

Tank Capacity

The water booster tank shall have a capacity of **750 US gallons of water and 20 gallons of foam concentrate** complete with lifetime warranty. The tank manufacturer shall mark the tank and furnish notice that indicates proof of warranty. The purpose of the markings and notice is to inform department personnel who store, stock, or use the tank that the unit is under warranty. Markings may be brief but should include a short statement that a warranty exists, the substance of the warranty, its duration, and who to notify if the tank is found to be defective.

The water tank shall be constructed from all polypropylene type material and shall be completely NFPA compliant upon completion. There shall be a fill tower in the left front corner of the tank, unless otherwise specified, with minimum dimensions of 10" x 10". There shall be a 4" minimum overflow/vent pipe installed into the fill tower directed to a location behind the rear wheels for air to vent and excess water to discharge from the tank without flowing into the hose bed or onto the body compartments. There shall be a sump located in the tank of the apparatus for "hooking" up the tank to pump line where all the water in the tank can be utilized. There shall be a 3" NPT plug in the bottom of the sump that can be removed for a cleanout, to remove any debris that may

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enter the tank. The tank shall be supplied with one (1) tank fill line with a flow deflector installed for filling the tank. The tank can be filled at a maximum rate of 1000 GPM.

The tank shall be mounted into the apparatus body per tank manufacturer's recommendations and NFPA recommendations.

Apparatus Body

Stainless Steel Body

Stainless Steel Body Construction and Sub Frame

The apparatus body shall be of stainless-steel construction, using the electrically welded and bolted design and assembled with formed panels and structural tubing extrusions. The vertical body corners shall be constructed with brake formed 12-gauge stainless steel corners. The remaining body shall be fabricated from 12 gauge formed stainless steel sheeting. The body shall be welded directly to the body subframe with 2" x 3" x 1/4" wall tubes that run the full width of the apparatus body in a minimum of four (4) locations, more with tandem axle chassis/bodies. Additional crossmembers shall be installed not more than 16" apart and shall be as wide as practical within the space provided. Longitudinal members will be added to tie the crossmembers together and provide a structurally sound and stable unit. Bracing and gussets shall be used at the manufacturer's consent to enhance the durability and life of the apparatus body without affecting the overall appearance of the finished product.

The hose body side panels shall be 12-gauge stainless steel and shall leave the hose bed with a smooth finish.

The rear of the apparatus body shall be squared off to open up the rear of the apparatus both physically and visually.

Anti-Corrosion Protection

No dissimilar metals shall contact each other. All stainless-steel screws shall have a nylon washer under their heads and "ECK" (Electrolysis Corrosion Kontrol) coated threads a non-hardening isolating material. All fasteners shall be stainless steel. No pop rivets shall be used in the construction of the apparatus. "ECK" shall also be used behind all lights and mounting brackets to aid in corrosion protection.

Sub Frame

There shall be a sub frame made up of all stainless-steel extrusions electrically welded together for superior strength. The subframe shall be electrically welded to 1/2" x 3" stainless steel flat bar that run the full length of the apparatus body, which is then U-bolted to the chassis frame.

Between the sub frame and the frame rails there shall be 1/2" x 3" layer of fiber reinforced rubber of 60D hardness to separate the two dissimilar metals. The rubber is to prevent any electrolysis between the two dissimilar metals and to provide a cushion for the body onto the chassis frame.

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The sub frame shall be made up of 2" x 3" x ¼" wall extruded stainless-steel tubing and/or 3" stainless steel channel extrusions.

Body Compartments

All the body compartments shall be constructed of 12-gauge stainless steel and shall be provided with a sweep out floor design. There shall be hat sections installed under the apparatus body compartments to help support the floors when loaded with heavy equipment.

All compartments shall have louver panels at the back walls for adequate ventilation. Louver openings shall be open toward the top and to the inside of the compartment to help prevent foreign objects and road splash from entering the compartments. Each compartment shall have lighting installed to illuminate the compartment during low light and dark conditions.

Compartment Layout

(Compartment sizes are approximate sizes and may change with the chassis style, body style, and Cab to axle distance.)

Driver's Side

L1-The compartment over the rear wheels shall be equipped with two (2) vertically hinged swing open aluminum doors.

Approximate size is: 34" high x 57 ½" wide x 14" deep. The compartment shall be equipped with one (1) adjustable height shelf.

L2-The compartment behind the rear wheels shall be equipped with vertically hinged aluminum double doors.

Approximate size is: 60 ¼" high x 42" wide x 26" deep at the lower portion and 14" deep at the upper portion. This compartment shall be equipped with one (1) 300lb floor mounted slide out tray and two (2) adjustable height shelves.

Passenger Side

R2-The compartment over the rear wheels shall be equipped with two (2) vertically hinged swing open aluminum doors.

Approximate size is: 34" high x 57 ½" wide x 14" deep. This compartment shall be equipped with one (1) adjustable height shelf.

R3-The compartment behind the rear wheels shall be equipped with vertically hinged aluminum double doors.

Approximate size is: 60 ¼" high x 42" wide x 26" deep at the lower portion and 14" deep at the upper portion. This compartment shall be equipped with one (1) 300lb floor mounted slide out tray and two (2) adjustable height shelves.

Rear Compartments

RR1-The compartment located at the rear of the apparatus shall be equipped with dual vertically hinged aluminum doors.

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Approximate size of the compartment is: 42" high x 43" wide x 28" deep full height. This compartment shall be equipped with one (1) adjustable height shelf and one (1) 300lb floor mounted slide out tray.

Compartment Doors

The compartment doors shall be constructed entirely from aluminum using a flush type configuration 1 5/8" door with 1/8" diamond plate inner panel fastened to the door with stainless steel fasteners. Two (2) 1/4" holes shall be installed in the lower corners of the inside door pans for drainage. There shall be a "hat stake" section inside each door to enhance the overall strength and durability of the doors. Doors shall be fully weather stripped with hollow core tubular automotive "D" type material. The compartment doors shall have a double catching two-point safety slam heavy-duty stainless-steel latches 6" circle type with rubber gaskets for electrolysis protection, recessed inside the 1 5/8" thick double pan door. Latches shall meet strength requirements for passenger doors as specified in the Federal Motor Vehicle Standard they shall be Eberhard model U-106 slam latches. The "D" rings shall have a slight break outward to facilitate easy access while using gloves. The doors shall be securely attached to the apparatus body with full-length 16-gauge stainless steel piano type hinges with stainless steel pins and fasteners. **(Pop Rivets shall NOT be used for attaching compartment doors to the apparatus body.)** All horizontally hinged doors shall have a pneumatic cylinder door check device. The pneumatic door holder permits the slide to pass over center and holds the door at 90 degrees to the body. The door is self-closing when pushed past the midpoint of its swing. All vertically hinged doors will be provided with a Cleveland style positive door check.

Adjustable Shelf Tracking

There shall be one (1) pair of adjustable tracking installed in each compartment on the apparatus where shelves are to be mounted. The tracking will allow for the mounting of adjustable shelves.

Adjustable Shelves

There shall be seven (7) adjustable height shelves supplied with the apparatus upon delivery. The shelves will be installed in the compartments per the compartment layout. The shelves shall be made from smooth aluminum with a 2" lip on the front and the back in opposite directions for added strength, and to prevent equipment from sliding off and jamming against the door. The shelves shall have a "DA" style finish.

Slide Out Tray

There shall be three (3) slide out trays installed on the apparatus with a 300 lb capacity in the extended position. The slides shall be Accuride slides with an aluminum tray with 2" sides that lock in the "In" and "Out" positions with the trip mechanism at the front of the tray that is easily accessible with a gloved hand. The trays shall be installed in customer specified locations on the body. There shall be alternating Red/White reflective striping installed at the three (3) sides of the tray for enhanced safety of the apparatus.

Compartment Matting

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There shall be modular plastic floor matting installed at the bottom of each compartment, tray, and shelf in the apparatus body. The matting shall allow air to move freely around equipment in the compartments to help prevent mold and mildew from forming on or around equipment.

Body to Frame Attachment

The entire body is to be electrically welded to the sub frame and be fastened down to the chassis frame with a minimum of 5/8" "U" bolts.

SCBA Bottle Storage

There shall be four (4) storage compartments located in the rear wheel wells of the apparatus. The compartments shall be sized to fit one (1) SCBA air cylinder in each. There shall be two (2) each side at the upper corners of the wheel wells. The compartments shall have a Cast Products cast aluminum door and each bottle shall be stored in an aluminum tube. The bottom of the tube shall be lined with 1/8" thick rubber for protection of the bottle and there shall be a 1/4" hole located at the rear bottom of the tube for drainage.

Wheel Liners/Fenderettes

There shall be rounded wheel liners installed in the body to protect the tank from being hit with road debris. There shall also be installed a black rubber radius fenderette which is bolted to the body if it needs to be removed or replaced.

Aluminum Diamond Plate Overlays and Trim

The top of the apparatus body compartments shall be finished with aluminum diamond plate. The aluminum diamond plate shall extend to the top edge and break down over the sides of the body approximately 2" with a 45-degree formed in drip edge above the side compartment doors.

At the front of the body there shall be aluminum diamond plate installed full height to be a stone shield and to protect the body from road debris.

The entire rear panel of the apparatus shall be smooth aluminum material painted to match the apparatus body. This will allow the installation of the rear chevron striping. There shall be stainless steel scuff plates installed from the hose bed floor to the top of the side body panels approximately 12" deep from the rear of the hose bed to protect the body and paint finish from scratching and marring.

Hose Bed

The hose bed shall be 95 1/2" wide and shall have hose storage beds at either side of the center ladder/hard suction hose storage provisions. The hose bed floor shall be constructed of aluminum extrusion and be spaced 1/4" apart and supported underneath for ample air flow between the top of the tank and the hose bed. The hose bed floor shall be easily removable. The inside of the hose bed shall be smooth and free of any projections, (sharp angles, nuts, or brackets), which may injure the hose.

Hose Bed Dividers

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There shall be two (2) hose bed dividers installed on adjustable tracking, one (1) at each hose bed. The dividers shall be made of 3/16" smooth aluminum welded into a "T" extrusion and shall be supplied with a radius corner at the rear with hand cut out.

Ladder and Hard Suction Hose Storage

There shall be a storage provision at the center of the hose bed for ground ladders and the hard-suction hoses. The ladders will be stored horizontally, lying flat, at the hose bed floor and the hard-suction hoses will be stored above the ladders. The ladders to be stored in this location are one (1) Duo Safety 912-100 20' 3-section extension ladder, one (1) Duo Safety 1275-FR 8'-16' folding roof ladder and the suction hoses will be three (3) 5" x 8' hoses. The storage provision will be supplied with smooth aluminum sides with an aluminum diamond plate top, which will incorporate a channel at each side for the hose bed cover to set onto when closed. This channel will also direct water to either end of the hose bed.

The ladder and suction hose compartment will be supplied with a horizontally hinged lift up aluminum door enclosure. The door will have a gas prop to hold it open and a latch to hold it closed.

Hose Bed Cover

There shall be two individual 1/8" "embossed" aluminum diamond plate, hinged hose bed covers, one (1) over each hose bed and hatch compartment on the apparatus body. The hose bed cover shall be slightly higher toward the middle of the body than the sides for water runoff and shall be properly supported underneath to accommodate two (2) firefighters standing on the cover without damaging the cover. The covers shall open to each side of the apparatus body with the assistance of pneumatic lift assist cylinders and grab rails at each end of the covers. The covers when open shall be supported in the upward position as close to 90-degrees as possible. The covers shall be supported underneath at the hard-suction hose compartment channels, which shall incorporate an aluminum channel to direct water to each end of the cover and not allow water to run into the hose bed.

There shall be lights installed at each end of the covers to illuminate the hose bed. The lights shall be wired to a switch to automatically activate upon opening the cover. This switch shall also activate the open compartment door indicator light in the cab of the apparatus.

There shall be vinyl flaps installed at the rear of the aluminum hose bed cover to cover the remaining portion of the hose bed at the rear. The flaps shall be held in place at the bottom with shock cord hold downs. The flaps shall be used as a NFPA compliant hose restraint device.

Backboard Storage

There shall be two (2) backboard storage compartments supplied on the apparatus. There shall be one (1) storage pocket at the bottom side of each hose bed cover. The pocket will be fabricated from smooth aluminum and will have a cap at the front to prevent the board from sliding out of the front and held in place with the rear hose bed flaps.

Hatch Compartments

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There shall be two (2) hatch compartments fabricated into the normal apparatus body construction at the top of the driver's side and passenger side compartments of the apparatus body. The compartments shall be at the outer portions of the hose bed and shall be covered by the aluminum diamond plate hose bed covers. The compartments shall be full body length with the width being adjustable with the hose bed divider at each side. The depth of the compartments shall be the same depth as the hose bed, 15 ¾" deep. The compartments floors shall be the same aluminum hose bed grating as the hose bed area. The compartment shall be equipped with an LED light strip for illumination at the top edge of the compartments.

Hand Rails

There shall be four (4) hand rails installed, one (1) each side vertically mounted at the rear of the apparatus, one (1) horizontally mounted at and just below the hose bed full width of the hose bed and one (1) vertically mounted at the driver's side front corner of the apparatus body. The hand rails shall be rigidly mounted in chrome plated stanchions and be anodized aluminum extrusion, which is grooved and aggressively knurled to reduce hand slippage.

There shall be two (2) additional handrails installed on the apparatus body above the pump module. There shall be one (1) each side horizontally mounted on the outer edges of the pump module.

Rub Rails

There shall be rub rails installed around the perimeter of the body below the bottom compartments. The rub rail shall be an extruded aluminum channel approximately 3" high x 1" wide with the flat side of the channel to the body side. The rub rail will then be installed using Teflon spacers to keep the rub rail away from the body and be bolted for easy removal and allow drainage between the body and the rub rail.

Alternating Red/White reflective material shall be inserted into the rubrail for additional reflectivity.

Folding Steps

There shall be nine (9) Cast Products model SP4401-1CH-BL-A folding cast aluminum steps with open grip strut at the stepping surface supplied and installed three (3) each side at the rear of the apparatus body and three (3) at the left front corner of the apparatus body. The front portion of the step shall have a handhold built into the step and there shall be a LED lights installed at the top and bottom of the step. The steps shall be a minimum of 35 square inches and N.F.P.A. compliant.

I-Zone Brackets

There shall be four (4) I-Zone brackets supplied and installed on the apparatus. There shall be two (2) at the rear of the apparatus body, one (1) each side. There will also be one (1) at each end of the front bumper. There will be storage provisions at both the front and rear of the apparatus for the I-Zone brackets to be stored when not in use.

Running Boards

There shall be running boards installed at each side of the pump compartment of the apparatus. The running boards shall be fabricated from 3/16" "embossed" aluminum diamond plate. The running boards shall run the full length of the pump compartment and as wide as the body rub rails to provide a streamline appearance. The running boards shall be supported underneath by 2" angle that extends off of the apparatus subframe and shall be spaced off the pump compartment approximately 1/2". There shall be an approximately 6" "kickplate" installed on the pump compartment at running board height to protect the painted finish.

Rear Step

There shall be two (2) Zico model PS-8-5 manual slide out drop-down steps located one (1) each side in the rear of the apparatus directly below the folding steps. The steps shall store into a pocket at the rear of the apparatus body and shall be easily deployed as needed. The step shall allow personnel to access the folding steps at the rear of the body with the proper NFPA required step heights strictly adhered to, 24" from ground to first step and 18" at the remaining steps.

Spare Tire Storage

There shall be a small utility winch supplied and mounted between the frame rails at the rear of the chassis to store a spare truck wheel. The winch will have an attachment that will pass thru the center of the wheel and will lift the wheel to the bottom of the frame rails. There will also be additional straps or chains installed to aid the winch in securing the wheel to the bottom of the frame rail.

Electrical System

12-Volt Electrical System Test

The low voltage electrical system shall be tested and certified per NFPA 1901 requirements.

A certificate of compliance shall be provided with the completed vehicle upon delivery.

Minimum electrical load consists of the total amperage required to simultaneously operate the following in a stationary mode at the incident scene.

- The propulsion engine and transmission.
- All clearance and marker lights.
- The communication radio. (Default of 5.0 amps used testing).
- Illumination of all walking surfaces, the ground at all egress points, controls and instrument panels and 50% of the total compartment lighting load.
- Minimum warning lights required for "Blocking Right of Way" mode.
- The current to simultaneously operate any fire pump, aerial device and hydraulic pumps.
- Anything defined by the purchaser to be critical to the mission of the apparatus.

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The first test for the electrical system is the **Reserve Capacity Test**. All the above listed components operate with the engine shut off. After 10 minutes all electrical loads are shut off and the battery system must have adequate reserve power to start the engine.

The second test is the **Alternator Performance Test at Idle**. All the above listed components operate with the engine at an idle. There can be no current draw from the batteries of the apparatus.

The third test is the **Alternator Performance Test at Full Load**. All electrical components shall be activated with the engine operating at governed RPM for two hours. During the test the system voltage cannot drop below 11.7-volts or have excessive battery discharge for more than 120 seconds. Any loads not listed in the minimum electrical load may be load managed in order to pass the test.

Wiring

All electrical equipment shall be installed to conform to modern automotive practices. All wiring is to be SXL ultra-high temperature cross-link type. Wiring installed by the builder to be run in loom or conduit, where exposed to the outside, it should have grommets where the wire passes through a metal plate and shall be protected by automatic reset circuit breakers which conform to SAE standards. The breakers shall be selected to prevent wire damage when subjected to extreme overload. Wiring to be color, function, and number coded every 3", the entire length of run.

All electrical components to have a 125% maximum rating for current carried.

ES-Key Management System

The apparatus shall be equipped with a Class 1 ES-Key Management System for controlling electrical system devices. This management system shall be capable of performing loan management functions, system monitoring and reporting, and be fully programmable for a standardized electrical system.

The ES-Key system shall utilize a Controller Area Network to provide multiplexed control signals for "real time" operation.

Vehicle Data Recorder (VDR - Black Box)

There shall be a Vehicle Data Recorder (VDR-Black Box) installed on the apparatus. The VDR will capture data once per second in 48-hour loop. The VDR shall monitor and record the following information; Acceleration/Deceleration, Engine Speed, Engine Throttle Position, ABS Event, Seat Occupied & Seat Belt Status, Master Warning Device Switch On/Off, Date/Time. There will a minute by minute summary for 100 engine hours.

Seat Belt Warning System

There shall be a seat belt warning and indicator system installed in the cab of the apparatus warning the driver with an audible alarm that a certain seat is being occupied and the seat belt is not fastened. There shall be an icon display at the center console of the apparatus to indicate the seating position.

EMI/RFI Protection

The apparatus design and construction shall incorporate the latest designs in incorporating Electromagnetic Interference Suppression, which is required to satisfy the radiation limits specified in SAE (Standard for Automotive Excellence) J551. "Performance Levels and Methods of Measurement of Electromagnetic Radiation from vehicles and devices (30-1000 MHz), and of which has been adopted by NFPA 1901. System design and components used shall insure that radiated and conducted electromagnetic interference (EMI) and radio frequency interference (RFI) emissions are suppressed at the source.

The apparatus proposed shall have the ability to operate in the electromagnetic environment typically found in fireground operations.

EMI/RFI susceptibility shall be controlled by applying immune circuit designs, shielding, twisted pair wiring and filtering. The electrical system shall be designed for full compatibility with low-level control signals and high-powered two (2) way radio communication systems. Harness and cable routing shall be given careful attention to minimize the potential for conducting and radiated EMI/RFI susceptibility.

Master Switch Panel

All electrical light switches shall be mounted on the cab console by means of a custom switch panel. It shall be accessible to the driver and the officer. A Main Master Switch and individual switches to be provided to allow pre-selection of emergency and scene lights.

The light switches are to be "rocker" type with an internal indicator light to show when the switch is energized. All switches to be properly identified and mounted in a removable panel for ease in servicing. A backlit panel shall be used to identify the switches when it's dark.

Each rocker switch shall energize a 40-amp continuous duty relay. Each relay shall be labeled as to its function.

Two (2) wiring diagrams for 12 VDC and/or 120/240 VAC, the body electrical system shall be included with the apparatus as built.

The electrical junction box for all 12-volt wiring shall be located in a convenient location. It shall have a hinged aluminum diamond plate access panel. All components in the compartment shall have identification tags.

Compartment Lights

There shall be two (2) LED compartment strip lights installed in each compartment, one (1) each side of the door opening, full height, wired to the door switch. Upon opening the compartment door, the lights automatically come on.

Open Compartment Door Indicator Light

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There shall also be a Red LED “open door” indicator light mounted in the cab where the driver can see it. This is to alert the driver that there is a door open or ajar on the apparatus. This light is also wired to the door switch.

Ground Lights

There shall be eight (8) LED ground lights are to be installed under the apparatus body. There shall be one (1) under each cab door, one (1) each side under the pump panel running boards, and two (2) lights located under the rear of the body. These ground lights will be activated upon setting the parking brake.

Step Lights

There shall be eight (8) LED step lights installed on the apparatus. There shall be one (1) Tecniq Dragon LED light with stainless steel shield below each cab door, one (1) 4” sealed light each side at the pump panel running boards and two (2) chrome-plated shielded lights at the rear step area. These lights shall be activated upon setting the parking brake.

Pump Compartment Lights

There shall be two (2) LED lights with manual switches mounted in the pump compartment to help in servicing the pump.

Engine Compartment Lights

There shall be two (2) LED lights with manual switches mounted in the engine compartment to help in servicing the engine.

Stop, Tail, Directional Lights

There shall be installed two (2) sets of Tecniq 4” round LED stop/tail/directional, and back up lights at the rear outer most location. The red taillights shall be model T40-RRFP-1, the amber turn signals shall be model T40-AAFP-1 and the backup lights shall be model T41-WCFP-1. The lights shall be wired to the chassis electrical system for operation. These lights shall be supplied with a flange style mount.

License Plate Light and Bracket

There shall be an LED license plate light and bracket installed at the rear center of the apparatus body.

Back Up Alarm

There shall be installed one (1) 107db back up alarm wired to reverse gear on the transmission.

Clearance Lights/Reflectors

There shall be LED clearance lights installed at the lower rear panel of the apparatus built into the body. There shall be a cluster of three (3) in the center, one (1) at the outer most corner facing to the rear, and one (1) each side as close to the rear corner as possible facing to the side.

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There shall also be DOT reflectors at the outer most corners one (1) each side toward the rear and one (1) each side toward the side. An additional Amber midship reflector shall also be installed each side ahead of the rear wheels.

Whelen Pioneer Flood/Spot Surface Mount Lightheads (Scene Lights)

There shall be four (4) Whelen Pioneer Plus™ Model # PCPSM1C scene lights provided, one (1) each side at the upper front of the body sides and two (2) at the upper rear body panel, one (1) each side. The 76 watt +12v DC single Pioneer lighthead shall incorporate Super-LED® combination flood/spot light installed in ABS Cyclac™ resin surface mount housing. The surface mount housing will be chrome plated. The PCPSM1C configuration shall consist of 12 white Super-LEDs for the spot light with a specialized spot reflector on the bottom, 24 white Super-LEDs in the flood light with a clear optic collimator/metalized reflector assembly on the top, and a clear non-optic polycarbonate lens. The Pioneer flood/spot light shall have 7,800 usable lumens. The PCPSM1C new combination optic design projects light directly down at 5° and producing illumination to the side of the vehicle arching upward to a 90° pattern of light.

The lens assembly shall utilize a liquid injected molded silicone gasket to be resistant to water, moisture, dust, and other environmental conditions. The hard-coated lens shall provide extended life/luster protection against UV and chemical stresses. The PCPSM1C shall be vibration resistant. The Pioneer™ PC boards shall be conformal coated for additional protection. One breathable membrane patch shall be installed on the rear of the housing to maintain a consistent internal pressure. The PCPSM1C shall have extended LED operation with low current consumption and low operating temperature.

The PCPSM1C shall be furnished with a 2' 2/C 18GA unterminated Heyco® cable. The Pioneer shall be SAE 1113-42 compliant and Class 5 testing for EMI. The PCPSM1C is covered by a five-year factory warranty. The PCPSM1C shall have built-in nylon screw grommets eliminating galvanic corrosion. The surface mount Pioneer requires no body cut-out. The PCPSM1C shall have a uniquely designed molded two-part silicone grommet to seal the 1" wire entry into the body.

Voltage: +12v DC

Size: H=6.37", W=8.97", D=1.72

Amp Draw: 6 Amps

Lens Color: Clear

The rear lights shall be wired to reverse gear of the transmission so the light automatically comes on when the truck is shifted to reverse gear. The lights shall also be wired to the in-cab switch panel and be activated with an individual switch for the lights.

Telescopic LED Floodlights

There shall be two (2) Fire Research Evolution II LED model FCA530-V11 side mount push up telescopic lights installed, one (1) each side at the rear body panel, with light switches on the head. The light pole shall be anodized aluminum and have a knurled twist lock mechanism to secure the extension pole in position. The extension pole shall rotate 360 degrees. The outer pole shall be a grooved aluminum extrusion and qualify as an NFPA compliant handrail. The pole mounting brackets shall have a 3 1/2" offset. Wiring shall extend from the pole bottom with a 4' retractile cord.

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The lamphead shall have four (4) ultra-bright white LEDs. It shall operate at 12/24 volts DC, draw 7.5/3.75 amps, and generate 11,000 lumens. The lamphead shall direct 50 percent of the light onto the action area while providing 50 percent to illuminate the working area. The lamphead angle of elevation shall be adjustable at a pivot in the mounting arm and the position locked with a round knurled locking knob. The lamphead shall incorporate heat-dissipating fins and be no more than 5 3/16" deep by 3 5/16" high by 7 5/8" wide. The lamphead and mounting arm shall be powder coated white. The floodlight shall be for fire service use.

Warning Systems

(All warning systems will be provided as per NFPA 1901 requirements.)

The optical warning system on the fire apparatus shall be capable of two (2) separate signaling modes during emergency operations. The first mode shall signal to drivers and pedestrians that the apparatus is responding to an emergency and is CALLING for the "Right-of-way". The second mode shall signal that the apparatus is stopped and is BLOCKING the "Right-of-way".

The switching between modes shall be provided by a sensor that senses the position of a parking brake or the park position of an automatic transmission. When the master optical warning system switch is closed, and the parking brake is released or the automatic transmission is not in park, the warning devices signaling the call for "Right-of-way" shall be energized. When the master optical warning system is closed, and the parking brake is on or the automatic transmission is in park, the warning devices signaling the blockage of the Right-of-way shall be energized. The system shall be permitted to have a method of modifying the two signaling modes.

Light Bar-Whelen Freedom IV Model F4N2VLED (Red, White)

There shall be one (1) Whelen Freedom IV 55" LED light bar mounted on the roof of the cab and wired to the in-cab switch panel. The light bar shall have two (2) red forward-facing LED modules, two (2) clear forward facing LED modules, two (2) red front corner LED modules, two (2) red rear corner LED modules. This light bar fulfills the requirements for Upper Zone A. The light bar lenses shall be clear in color.

Any clear warning light(s) in the light bar will be deactivated automatically for the "Blocking the Right of Way" mode.

Grille and Intersection Lights-Whelen SurfaceMax LED Flashers (Red)

There shall be two (2) grille lights installed at the front of the cab, one (1) each side, and two (2) intersection lights installed, one (1) each side of the bumper extension. The lights shall be Whelen, model C7LR LED flashers wired to the in-cab switch panel. These lights shall fulfill the requirements of Lower Zone A.

Lower Side Lighting-Whelen SurfaceMax LED Flashers (Red)

There shall be two (2) Whelen, model C6LR LED flashers mounted one (1) each side at the rear wheel well area. The lights shall be wired to the in-cab switch panel. These lights shall fulfill the requirements of Lower Zones B and D. All of these lights shall be Red in color.

Lower Rear Lighting-Whelen SurfaceMax LED Flashers (Red)

There shall be two (2) Whelen, model C6LR LED flashers mounted one (1) each side at the rear of the apparatus above the rear taillights. The lights shall be wired to the in-cab switch panel for operation. These lights shall fulfill the requirements of Lower Zone C. The lights shall be Red in color.

Upper Flashers-Whelen SurfaceMax LED Flashers (Red)

There shall be four (4) Whelen, model C9LR LED flashers mounted one (1) each side at the upper rear corner, side facing, and two (2) at the upper rear panel below the suction hose storage compartment. The lights shall be Red in color. The lights shall be wired to the in-cab switch panel for operation. These lights shall fulfill the requirements of Upper Zone B, C and D.

Siren & Speaker

There shall be installed one (1) Whelen model 295SLSA1 siren amplifier mounted in cab where both driver and officer can reach it shall be wired to the cab electrical system. There shall also be installed one (1) Whelen, model SA315P, 100-watt weatherproof speaker at the front bumper and wired to the siren amplifier and to the cab electrical system.

Loose Equipment

The following is a list of the loose equipment to be supplied with the apparatus upon delivery.

Set of Worden non-folding wheel chocs with mounting brackets (shipped loose)

One (1) 20', aluminum, Duo-Safety, model 912-100, three-section extension ladder

One (1) 8'-16', aluminum, Duo-Safety, model 1275-FR, folding roof ladder

Three (3) 5" x 8' lightweight hard suction hoses with NST couplings, rocker lug female swivel x rocker lug male

One (1) 5" barrel strainer

****Note: Any additional loose equipment items outlined in NFPA 1901 section 5.8 will be customer supplied and installed on the apparatus before the unit is placed into service. This equipment is not included in this proposal!***

Paint/Misc.

Paint Code:

The apparatus tank and wheels shall be painted one (1) solid color per fire department specifications using Sikkens Autocoat LV650 top coat/clear coat paint. The painting process shall be done by, AkzoNobel/Sikkens trained personnel in the automotive painting industry. The following procedure shall be followed during the painting process:

- 1) All items such as brackets, compartment doors, door hinges, and diamond tread aluminum plate, etc. should be removed from the apparatus or body.

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- 2) Entire unit should be solvent washed using a two (2)-rag method using Sikkens Antistatic degreaser.
- 3) The welded areas on the entire unit should be ground down with a 36-grit disc for steel, and 80 grit discs for aluminum. Compartment seams and others not receiving the grinding process should be wire wheeled. All surface area then should be DA sanded using 120 grit then 180 grit on steel or Galvneal. On aluminum use 150-180 grit.
Filling should be done where necessary with professional grade lightweight polyester resin filler. Presanding the polyester filler is recommended.
Final sanding should be done no courser than 180 grit.
- 4) Entire unit should be solvent washed using a two (2)-rag method using Sikkens Antistatic degreaser
- 5) The unit is wiped with Sikkens Auto Prep Wipes using a cross hatch method with one application. After a flash of 15-20 Minutes@70 degrees 3 coats of Sikkens Autocoat LV 650 Surfacer shall be applied. Mixed 5 Parts Autocoat LV 650 Surfacer filler then 1 part Autocoat LV 650 Surfacer Hardener then 1 part of Autocoat LV 650 Reducer slow. Dry film thickness will be around 4.0-5.0 mils.
- 6) Sanding of Autocoat LV 650 Surfacer should be accomplished using 320 grit until all scratches are removed. Pinholes should be filled with Sikkens Kombi Putty.
- 7) Upon completion of the sanding procedure, all welded seams should be caulked with a compatible urethane caulk that is non-hardening and remains flexible during any atmospheric condition.
- 8) After the unit is hand washed with Sikkens Antistatic using the two-rag method, and tack wipe remaining lint to remove any surface partials.
- 9) Any bare aluminum, stainless steel, or steel needs to be pretreated with Sikkens Autoprep Wipes. After a flash of 15-20 minutes the unit is then sealed with Autocoat LV 650 Sealer using a slow reducer appropriate for the temperature and job size.
- 10) Basecoat until hiding is achieved with Autocoat LV 650 Basecoat color mixed 3.5 parts of Autocoat LV650 Basecoat to 1 Part Autocoat LV650 Hardener to 1 Part Autocoat LV650 Reducer.
- 11) After 45 minutes Clearcoat with Autocoat LV650 Clearcoat Mixed 5 Parts of Autocoat LV650 Clearcoat to 2 Parts of Autocoat LV 650 Surfacer Hardener to 2 Parts of Autocoat LV650 Reducer
- 12) Unit should be allowed to dry 48 hours prior to applying decals.

Compartments

The inside of the apparatus compartments shall be sprayed with a white base coat and then spatter painted with black and gray. The compartments will then be clear coated to allow for easier cleanup and for greater appearance.

Undercoating

The inside and the underside of the apparatus body shall be sprayed with a rubberized vehicle undercoating to protect the body from corrosion. The inside will sprayed to the top of the water tank level.

Lettering

Arizona, AZ FD

There shall be vinyl Gold reflective letters with black drop shadow, sixty (60), applied on the apparatus per department specifications. (There shall be a picture supplied by the department of the style and what they want for lettering to the salesperson or to the manufacturer.)

Reflective Stripe

There shall be applied one (1) 6" white Scotchlite stripe with ¼" Black outline on the cab and body to enhance appearance and to be more visible in low light and dark conditions. There shall also be a reflective striping installed at the front of the apparatus where applicable.

There shall be reflective striping installed on the inside of the cab doors per NFPA regulations, minimum of 96 square inches each door.

The entire rear of the apparatus body and doors shall be covered with alternating 6" Red and Fluorescent Yellow/Green reflective material in an inverted "V" Chevron pattern. This shall be 3M Diamond Grade Scotchlite material for enhanced visibility and reflectivity at the rear of the apparatus.

Danger Plates

There shall be supplied and installed "Warning/Danger" plates on the apparatus.

There shall be one (1) plate installed in the cab within view of the driver stating the maximum number of passengers in vehicle.

There shall be one (1) plate installed in the cab within view of the driver stating the overall height, overall length and GVWR of the completed apparatus.

There shall be one (1) plate installed in the cab within view of all passengers stating; "DANGER-personnel must be seated and seat belts must be fastened while vehicle is in motion or Death or Serious Injury May Result".

There shall be one (1) plate installed at the rear of the apparatus body stating; "DANGER-do not ride on rear step while vehicle is in motion or Death or Serious Injury May Result.

There shall be one (1) plate installed in the cab of the apparatus stating all the fluid types and capacities for the apparatus chassis and optional equipment.

There shall be one (1) plate installed in the cab within view of all seating locations stating: "Helmets must not be worn in the apparatus while vehicle is in motion."

Approval Questions

1) Restrictions; Does this apparatus have any size restrictions?

Height_____ Length_____

2) Exhaust; Does the fire station have an exhaust ventilation system?

- A) What brand name system is currently installed?
 - B) What size does the exhaust need to terminate?
 - C) What location on the apparatus does the exhaust need to terminate?
- 3) Shoreline Locations; Do you have a specific location for the shoreline inlets, electric and air?
- 4) Paint; Do you have a paint code we need to utilize for the proper color match?
- A) What is the code for primary/lower color?
 - B) What is the code for secondary/upper color? (for two tones applications):
 - C) If there is a two tone what is the paint break?
- 5) Lettering/Striping; Do you have a lettering scheme you want to match? (Please provide pictures)
- A) What type of lettering needs to be installed? (Handpainted or Vinyl)
 - B) What type of lettering is it? (Gold Leaf, Reflective or Plain)
 - C) Do you have a department decal or seal that needs to be installed?
 - D) Is the department decal or seal going to be provided by the department?
 - E) What width of reflective stripe is required by the department? (NFPA Min. 4"/Most common is 6")
 - F) What color scheme is required for the stripe?

Approval of Specifications

We, the undersigned, having read, and with a full understanding of all the terms, conditions, and requirements of the specification, do hereby agree to have CUSTOM FAB & BODY, LLC manufacture and construct the above Type III Engine in accordance with the aforementioned apparatus specifications and procedures.

Purchaser's Department: _____

Purchaser's Name: _____ **Date :** _____

Purchaser's Title: _____

Purchaser's Authorized Signature: _____