

FC94 Pumpers

One (1) == Legals - Pumpers - 421.001 04/02/21 ==

One (1) Payment Terms: Ferrara Standard  
00-06-0420

**PAYMENT TERMS**

Full payment shall be made upon delivery and acceptance of the apparatus. The vehicle(s) shall not be released to the BUYER until payment is made. If the selling price is subject to any taxes, the taxes added will be that which are prevailing at the time of delivery.

Payment shall be made directly to Contractor. Payment shall be made in United States Currency. No checks or any other form of payment shall be made to any sales representatives, dealer, agents, etc.

If these payment terms are not strictly adhered to, Contractor shall assess a daily interest charge based on an annual percentage rate of 18% on the unpaid balance. If more than one vehicle is covered by this contract and the vehicles are shipped on different dates, the terms stated above shall apply to each vehicle.

One (1) Single Source Manufacturer  
00-12-0220

**SINGLE SOURCE MANUFACTURER**

To provide the customer with a single point of contact for service, warranty, and parts, proposals shall only be accepted from manufacturers who assemble the complete apparatus in their own facility.

One (1) Manufacturer - Virtual  
00-12-0420

**VIRTUAL MANUFACTURING**

The manufacturer shall have a web site available for the customers to watch their unit being produced. The "Trucks in Production" photos shall be updated as progress has been made to the unit.

The web site shall also include documentation of cab and body crash tests, take a virtual tour of the production facility, videos of both current and new innovative products, updates on trade shows, photos of new deliveries and the opportunity to include customer 'Action Photo's.

Customer shall be able to access the web site without the requirement of a password.  
One (1) Principal Dimensions  
00-12-0620

**PRINCIPAL DIMENSIONS**

One (1) Certified Welders  
00-12-0820

**CERTIFIED WELDERS**

The manufacturer shall employ individuals that are certified aluminum and stainless steel welders. The welders shall be certified by an outside testing laboratory. The certifications shall be available for viewing through the Human Resources office upon request.

One (1)  
00-12-1020 Body Weight

**BODY WEIGHT DOCUMENTATION**

The manufacturer shall weigh each body prior to mounting on the chassis. The information shall be included in the documentation of the finished vehicle. Each body produced by the manufacturer shall be weighed, not just one body per model.

One (1)  
00-14-0220 Drawings - Proposal

**DRAWING, PROPOSAL**

There shall be a proposal drawing submitted to the Fire Department. This drawing shall be a visual interpretation of the apparatus proposed.

One (1)  
00-14-0620 Drawings - Approval

**DRAWING, APPROVAL**

Prior to construction, the contractor shall provide three-(3) approval drawings of the apparatus for the fire department's review. The drawings shall show such items as the chassis being utilized, lights, horns, sirens, pump panels, and all compartment locations and dimensions. The blueprint shall be a visual interpretation of the unit as it is to be constructed, In the event of discrepancies on the print the specifications shall prevail. The buying authority shall sign all drawings. One-(1) print shall be retained by the Fire Department, the dealer/sales representative shall retain one-(1) print, and one-(1) print shall be returned to the manufacturer.

One (1)  
00-18-0820 Vehicle Transportation - DEALERS ONLY!!!!!!!!!!

**VEHICLE DELIVERY/TRANSPORTATION**

To insure proper break-in of all components while still under warranty, the apparatus shall be delivered over the road under its own power (Rail and/or truck freight shall not be acceptable).

Two Hundred Forty (240)  
00-18-1820 Delivery Time: Calendar Days

**DELIVERY TIME**

The apparatus shall be delivered within Two Hundred Forty (240) calendar days after receipt of the approved signed off pre construction changes.

The manufacturer shall not be held liable for changes arising from its failure to make or delay in making delivery because of fire, flood, strike, riot, chassis shortage, accidents, acts of God, or any circumstances beyond our control.

One (1)  
00-18-2020 Vehicle Familiarization & Demonstration

## **VEHICLE FAMILIARIZATION & DEMONSTRATION**

Familiarization and demonstration of the vehicle shall be by a competent and qualified person as defined in the current standard of NFPA 1901 standard.

Familiarization of the vehicle shall include the following:

How to locate gauges or indicators and check all fluid levels and operational issues of the vehicle

How to tilt the chassis cab or hood assembly for access to the engine, fire pump, or aerial control, or any other device to allow access to fluids or for required maintenance

Interior cab controls, instruments, mirrors, safety devices or alarms, brake operations, transmission control, pump controls, exhaust regeneration (if provided), seat adjustments, warning light engagement, and other operational equipment

If the apparatus is provided with a fire pump system, the following minimum instructions:

- a) Setting of parking brake, proper transmission gear, and fire pump engagement operations
- b) Throttle control
- c) Primer and tank-to-pump operation
- d) Use of pressure control devices
- e) Tank refilling operations
- f) Proper operation of discharge controls
- g) Proper shutdown and draining of system

If the apparatus is provided with a generator, the following minimum instructions

- a) Proper engagement if driven by the chassis
- b) Startup, operation, and shutdown of generator
- c) Monitoring of controls and instruments

If the apparatus is provided with a foam system, the following minimum instructions:

- a) Startup, operation, and shutdown of foam system
- b) Setting of foam percentages and other operational settings
- c) Proper flushing and draining of the system

If the apparatus is provided with a water tower or aerial device, the following minimum instructions:

- a) Positioning and locating the vehicle for safe operations
- b) Chassis parking brakes and engagement of hydraulic system
- c) Deployment of stabilization devices and use of ground pads
- d) Operation of elevation, extension, and rotation of the aerial device
- e) Operation of waterway, nozzle, and other firefighting devices of aerial device
- f) Operation and use of breathing air system (if provided)
- g) Specific aerial device maintenance and service areas for operators
- h) Shutdown and return to service operations
- i) Operation of tip controls and platform controls
- j) General familiarization and demonstration of aerial device

- k) Review of all safety devices, interlocks, and operational Hazards  
Service Contacts  
One (1)  
00-22-0220

**MANUFACTURER SERVICE CONTACTS**

The manufacturer must have a 24 hour/ 7 day a week, toll-free emergency hot line. The manufacturer must be capable of providing both in-house and on-site service for the apparatus. The service technicians shall be EVT certified in compliance with NFPA 1071 classifications F2 through F6. On-site service and maintenance shall be the primary function, to eliminate the vehicle having to leave the fire department jurisdiction. Copies of the certifications shall be made available through the Human Resources office.

- Company Service Vehicles  
One (1)  
00-22-0620

**SERVICE VEHICLES**

The manufacturer shall have a minimum of 10 full time, company owned, service vehicles. The vehicles shall be available 24 hours a day, seven days a week to respond to customer needs. The Service Vehicles shall be operated by full time EVT Certified Technicians.

- Replacement Parts  
One (1)  
00-22-0820

**REPLACEMENT PARTS**

Replacement parts shall be available directly from the manufacturer, as well as the dealer and or service centers.

- Service Center  
One (1)  
00-22-1020

**SERVICE CENTER**

- == Chassis Mods - STOCK UNIT - 421.001 04/02/21 ==  
One (1)

- Custom Chassis - Spartan FC94 MFD w/10" Raised Roof  
One (1)  
00-A2-0220

- Air Horn Lanyard - Centered Between Driver/Officer  
One (1)  
02-P6-0820

**AIR HORN CONTROL, LANYARD**

There shall be one-(1) lanyard air horn control installed in the cab between the driver and the officer. The lanyard shall be wired to the air horn(s).

- Speaker - PS Thru Bumper (P1)  
One (1)  
02-R2-0220

**SPEAKER, PASSENGER'S SIDE**

There shall be one-(1) speaker shall be installed thru the front face of the bumper passenger's side outboard.

- Siren Speaker - Cast Product SA4301  
One (1)

02-R4-0420

The speaker shall be a Cast Products SA4301, 100-watts wired to the electronic siren.

One (1) Exterior Trim - Tread Plate, Back of Cab

14-A6-8220

**TREAD PLATE BACK OF CAB**

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

One (1) Interior Trim - Lower Door Panels Chevron Material (4 Door Cab)

14-H4-0820

**INTERIOR DOOR STRIPING, CHEVRON**

12-Volt Power Outlet - Cab Mounted

Two (2)

16-M2-6420

**12-VOLT POWER OUTLET(S)**

There shall be two (2) 12-volt cigar lighter style power outlets provided in the cab.

Two (2) Wiring - 12-Volt Outlet, Battery Direct

16-M2-6620

The power outlet(s) shall be wired to direct battery power with the appropriate wire size and fuse.

One (1) Camera - Back Up w/Color Monitor, FRC TRUSIGHT BCA111-A00

18-M2-0220

**130° CAMERA WITH 18 INFRARED ILLUMINATORS & 7" DIGITAL MONITOR**

A Fire Research inView™ TrueSight™ model BCA111-A00 kit shall include: (1) one 130° camera with 18 infrared illuminators and (1) one 7" digital monitor.

The 130° Camera shall include the following features: 1/3" SONY® Color CCD Sensor, 250,000 pixels for Picture Elements and Gamma Correction with R=0.45 to 1.0. Camera shall have Mirror Image capability. (1) One 66 ft. Extension Cable shall be included for the camera. (1) One Screw Kit shall be provided for camera installation. The camera shall have a built-in high gain microphone. The Image Sensor shall provide 600 TV Lines PAL: 500(H) \*582(V), NTSC: 510(H) \*492(V). The 2.1MM Lens shall have a 130° Viewing Angle. The Waterproof rating shall be IP69K. The 130° Camera shall include an Internal Synchronization Sync System. Infrared Distance shall be 50 Ft. (18 Infrared IR). The Usable Illumination shall be 0 Lux (with IR ON). The Power Source shall be DC 12V (+/-10%). Signal-to-Noise ratio (S/N Ratio) shall be rated for higher than 48DB. The Electronic Iris rating shall be 1/50, 1/60-1/100,000 seconds. Video Output rating shall be 1VP.P 75 Ω. The IR Switch Control shall have a CDS Automatic Control. Vibration and Impact Rating shall be 20G/100G. The Operating and Storage Temperature ratings both shall be -40°F ~ +176°F / RH 95% Max.

The model BCA111-A00 kit shall also include one-(1) 7" TFT LCD Digital Color Monitor. The specifications shall be as follows for the monitor:

- Dot Resolution: 800 x 3 (RGB) x 480
- Display Format/Contrast: 16:9 / 500:1

- Display Brightness: 400 CD/m<sup>2</sup>
- Viewing Angle: U:50° D:60° L/R:70°
- 3 Channel Video Input
- 1 VP-P, 75Ω
- Power Supply – DC 12V-24V (+/-10%)
- Power Consumption – 5W
- Operating Temperature: -22°F ~ +176°F
- Video System: Auto NTSC/PAL
- Overall Dimensions: 7” (L) x 5” (H) x 1” (D)
- Weight: 400G
- Vibration Rating: 5G
- Dot Pitch: 0.192 (H) x 0.1805 (V)
- Internal Sync System

One (1)  
18-P2-0220  
Safety Signs - General Requirements

**SAFETY SIGNS, GENERAL REQUIREMENTS**

Safety signs with text shall conform to the general principles of ANSI/NEMA Z535.4, *Product Safety Signs and Labels*. Safety signs without text shall conform to the general principles for two-panel safety signs of ISO 9244, *Earth-Moving Machinery - Machine Safety Labels*.

Apparatus built for sale in the United States shall employ safety signage that complies with ANSI/NEMA Z535.4.

Apparatus built for sale outside the United States shall employ safety signage that complies with ANSI/NEMA Z535.4 or ISO 9244.

Safety signs referenced in this standard beginning with the letters FAMA shall conform to the text and graphics of the referenced safety sign number found in FAMA TC010, *Standard Product Safety Sign Catalog for Automotive Fire Apparatus*.

One (1)  
18-P2-2820  
Safety Sign - Vehicle Backing, FAMA17

**SAFETY SIGN, VEHICLE BACKING**

A safety sign FAMA17, shall be provided inside of the cab in view of the driver advising of proper procedures to following when the apparatus is in reverse motion. The label shall also warn of potential injury or death that be caused by failing to follow proper procedures.

One (1)  
18-P2-4020  
Safety Signs - Intake/Discharge Cap Pressure, FAMA18

**SAFETY SIGNS, INTAKE/DISCHARGE CAP PRESSURES**

If the apparatus is equipped with a pump system, safety signs FAMA18, shall be provided in all areas that intakes and discharges are capped. The label shall give instruction on how to properly remove the cap. The label shall also warn of potential dangers, injury or death that be caused by failing to follow proper cap removal procedures.

One (1)  
Safety Signs - Hose Restraint Required, FAMA22

18-P2-4220

**SAFETY SIGNS, HOSE RESTRAINT REQUIRED**

A safety sign FAMA22, which warns of the need to secure hose, shall be visible to personnel at each hose storage area.

One (1)  
18-P2-4620

Safety Signs - Riding on Exterior, FAMA24

**SAFETY SIGNS, RIDING ON EXTERIOR**

Safety signs FAMA24, which warns personnel not to ride on the vehicle, shall be located at the rear step areas and at any cross walkways.

One (1)  
18-P2-4820

Safety Sign - Pump Training, FAMA25

**SAFETY SIGN, PUMP TRAINING**

A safety sign FAMA25, which warns of the need for training prior to operating the apparatus, shall be located on the pump operator's panel.

One (1)  
18-P2-6020

Safety Signs - No-Step, FAMA26

**SAFETY SIGNS, NO-STEP**

Safety signs FAMA26, shall be provided in any horizontal location that a firefighter may feel tempted to use as a step but is not designed, constructed or intended to be a stepping, standing or walking surface. The label shall state that the surface is not intended for this purpose and indicate potential injury or death in doing so.

One (1)  
18-P6-0220

Plate - Fluid Capacity

**PLATE, FLUID CAPACITY**

A permanently affixed fluid date plate shall be installed in the driving compartment to indicate the type and quantities of the following fluid used in the vehicle.

- Engine Oil
- Engine Coolant
- Chassis Transmission Fluid
- Pump Transmission Lubrication Fluid (if applicable)
- Pump Primer Fluid (if applicable)
- Drive Axle Lubrication Fluid
- Air Conditioning Refrigerant
- Air Conditioning Lubrication Oil
- Power Steering Fluid
- Cab Tilt Mechanism Fluid
- Transfer Case Fluid
- Equipment Rack Fluid
- Air Compressor System Lubricant
- Generator System Lubricant

Front Tire Pressure - Cold  
Rear Tire Pressure - Cold

The following information shall also be supplied on the Fluid Data Plate:

Chassis Manufacturer  
Production Number  
Paint Number  
Year Built  
Date Shipped  
Vehicle Identification Number  
Plate - Overall Height/Length/Weight

One (1)  
18-P6-0420

**PLATE, OVERALL HEIGHT/LENGTH/WEIGHT**

An Overall Height/Length/Weight information plate shall be installed that can be clearly identified and visible to the driver while in the seated position showing the apparatus completed overall height, length, (in feet and inches) and gross vehicle weight (in tons) current to the apparatus manufactured date.

If changes to the vehicle occur while in service, the department must revise the overall height-length-weight plate.

One (1) == Pump Enclosure - SM Extruded - 421.001 04/02/21 ==

One (1) PUMP MODULE - SIDE MOUNT EXTRUDED ALUMINUM  
20-A2-0220

**PUMP ENCLOSURE, SIDE CONTROL**

The pump enclosure superstructure shall be constructed of aluminum tubing, channel, angle, and break-formed components. The framework shall be formed by beveled aluminum alloy extrusions and electrically seam welded both internally and externally at each joint using 5356 aluminum alloy welding wire. The main, frame work shall be constructed of 3.00 x 3.50, 6063-T6 aluminum extrusions. The break-formed components shall be constructed from 3/16" (1.875) aluminum.

The cross members support the substructure and the exterior panels independently from the cab and body. The cross members shall be isolated from the frame rails using torsion mounts. The pump enclosure shall be supported at the top of the frame rails, in a minimum of four-(4) places. The module shall be secured with angle brackets bolted to both the pump enclosure support cross rails and the side of the chassis frame rails. This design is required to eliminate shifting and stress on the pump enclosure, pump panels, and running boards.

The front of the pump module shall be covered with aluminum tread plate to keep road debris from the front of the pump.

The pump enclosure provides an area above the pump for the installation of crosslays or dunnage area.



Any pump enclosure constructed using any material other than aluminum or utilizing any other mounting method is not acceptable.

One (1)  
20-A4-2220  
Separate Pump Module - Extruded

**SEPARATE PUMP MODULE**

The pump module will be a self-supported structure mounted independently from the body and chassis cab. The pump module will be constructed entirely of extrusions and aluminum plate and shall be bolted to the chassis frame rails. The framework will be formed from beveled aluminum alloy extrusions and electrically seam welded both internally and externally at each joint using 5356 aluminum alloy welding wire. The main framework shall be 3.00 x 3.50, 6063-T6 aluminum extrusion. Aluminum angle will be welded such that a recessed pump panel can be mounted inside the extrusion perimeter. The module shall be mounted to the chassis frame rails utilizing a "U" bolt spring mounting system. The pump module design must allow normal frame deflection without imposing stress on the pump module structure or side running boards.

One (1)  
20-A4-4020  
Trim - Dunnage Area, Tread Plate

**DUNNAGE AREA W/TREADPLATE WALLS**

The open area above the pump enclosure shall be provided for additional equipment storage shall be trimmed with 1/8" (.125) aluminum tread plate on all vertical interior walls and shall have slotted aluminum floors.

One (1)  
20-C4-0220  
Pump Panels - Black Anodized Aluminum

**PUMP PANELS**

The operator's controls and gauges shall be mounted on pump panels constructed of 1/8" (.125) black anodized, non-glare aluminum. No vinyl coverings shall be acceptable as these surfaces are subjected to rough service and vinyl is susceptible to tearing.

The operator's master gauge panel shall be vertically hinged with push style latch for access to gauges and auxiliary controls.

The operator's control panel shall be located below the master gauge panel and constructed of 1/8" (.125) black anodized, non-glare aluminum.

All gauges and controls shall be properly identified with color-coded metal tags. The tags shall be affixed with 3M brand industrial adhesive. The gauges shall be functionally grouped above each control.

The right side upper panel shall be vertically hinged with double doors and push style latches for pump compartment access. The doors shall be constructed of .125" aluminum tread plate.

The right side lower panel shall be removable for serviceability. The panel shall be constructed of 1/8" (.125) black anodized, non-glare aluminum.

All instruments and controls shall be provided and installed as a group at the pump panel. The central midpoint or centerline of any valve control shall be no more than 72" vertically above the ground or platform that is designed to serve as the operator's standing position. The instruments shall be placed to keep the pump operator as far as practical from all discharge and intake connections and in a location where they are readily visible and operationally functional while the operator remains stationary.

A safety sign FAMA25, which warns of the need for training prior to operating the apparatus, shall be located on the pump operator's panel.

One (1)  
20-D6-0220  
Light - Left Side Pump Panel, OnScene LED Access

**PUMP PANEL LIGHT, LEFT SIDE**

One (1)  
20-D6-1220  
Light - Right Side Pump Panel, OnScene LED Access

**PUMP PANEL LIGHT, RIGHT SIDE**

One (1)  
20-D8-0620  
Light - Pump Compartment, LED

**LIGHT, PUMP COMPARTMENT**

One-(1) LED compartment light shall be installed in the pump compartment for inspection or routine maintenance. The light shall be wired to the pump panel light switch.

One (1)  
20-F4-0220  
Running Boards - Slotted Aluminum, Left & Right Side

**RUNNING BOARDS, LEFT & RIGHT SIDE**

Running board shall be provided on the left and right side of pump module constructed of anodized slotted aluminum extrusion. The extrusions shall be punched and raised to provide superior traction during inclement weather operations. The running boards shall be bolted to the pump module substructure and shall be spaced out 1/4" from the module for additional run off.

The running board stepping surfaces shall comply with the latest version of NFPA 1901.

One (1)  
20-J2-0220  
Gauges - Master Suction/Pressure, 4-1/2" Metal Face

**MASTER GAUGES, 4-1/2"**

Two compound 4-1/2" master gauges shall be provided and installed on the pump operator's panel. The intake and discharge gauges are liquid filled with a solution to assure visual readings and reduce inner lens condensation. The body of the gauges shall be constructed of Zytel nylon with chrome-plated bezels. The face of the gauges shall be Spun Metal with black background and white markings accurate within 1%.

The pressure gauges shall maintain performance of all features and be free from defects in material and workmanship which includes fluid fill leakage and discoloration for seven years.

One (1)  
20-J4-1620  
Pressure Governor - FRC Pump Boss PBA400-A00

**PRESSURE GOVERNOR and ENGINE MONITORING DISPLAY**

Fire Research PumpBoss series PBA400-A00 pressure governor and monitoring display kit shall be installed. The kit shall include a control module, intake pressure sensor, discharge pressure sensor, and cables. The control module case shall be waterproof and have dimensions not to exceed 6 3/4" high by 4 5/8". The control knob shall be 2" in diameter with no mechanical stops, have a serrated grip, and a red idle push button in the center. It shall not extend more than 1 3/4" from the front of the control module. Inputs for monitored engine information shall be from a J1939 data bus or independent sensors. Outputs for engine control shall be on the J1939 data bus or engine specific wiring. Inputs from the pump discharge and intake pressure sensors shall be electrical.

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.

A 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 monitoring pressure display shall be programmed at installation for a specific engine.

Nine (9)  
20-J6-0220  
Gauges - 2-1/2" Pressure, Metal Face

**PRESSURE GAUGES, 2-1/2"**

The discharges shall be provided with 2-1/2" pressure gauges. The discharge gauges shall be liquid filled with a solution to assure visual readings and reduce inner lens condensation. The body of the gauges shall be constructed of Zytel nylon with chrome-plated bezels. The face of the gauges shall be Spun Metal with black background and white markings reading from zero to 400 PSI.

The gauges shall be installed at each discharge control on the pump operator's panel. On side mount pump applications with push pull handles each gauge shall incorporate a Thuemling Instrument Group 1-piece module assembly consisting of the gauge, push-pull and trim bezel.

The pressure gauges shall maintain performance of all features and be free from defects in material and workmanship which includes fluid fill leakage and discoloration for seven years.

One (1)  
20-J6-6220  
Gauge Bezels - Color Coded

**GAUGE BEZELS, COLOR CODED**

The pump panel master and pressure gauge bezels shall be color coded.

One (1)  
20-M4-0220  
Tags - Pump Panel, Color Coded (Metal)

**PUMP PANEL TAGS**

All discharges, gauges, and controls will be properly identified by color-coded metal tags. The metal tags will be affixed with 3M industrial adhesive.

One (1)  
22-A2-0420  
Pump System - 1250-2000 GPM Single Stage, Hale QMAX

**PUMP SYSTEM, HALE QMAX SINGLE STAGE**

**PUMP ASSEMBLY**

The entire pump shall be cast, manufactured, and tested at the pump manufacturer's factory.

The pump shall be driven by a drive line from the truck transmission. The engine shall provide sufficient horsepower and RPM to enable pump to meet and exceed its rated performance.

The entire pump, both suction and discharge passages, shall be hydrostatically tested to a pressure of 600 PSI. The pump shall be fully tested at the pump manufacturer's factory to the performance specs as

outlined by the latest NFPA Pamphlet No. 1901. The pump shall be free from objectionable pulsation and vibration.

The pump body and related parts shall be of fine grain, cast iron alloy, with a minimum tensile strength of 30,000 PSI. All moving parts in contact with water shall be of high quality bronze or stainless steel. Pump utilizing castings made of lower tensile strength cast iron not acceptable.

Pump body shall be horizontally split, on a single plane, in two sections, for easy removal of entire impeller assembly including wear rings and bearings from beneath the pump without disturbing piping or the mounting of the pump in chassis.

The pump shall have one double suction impeller. The pump body shall have two opposed discharge volute cutwaters to eliminate radial unbalance.

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

The pump impeller shall be hard, fine grain bronze of the mixed flow design; accurately machined, hand-ground and individually balanced. The vanes of the impeller intake eyes shall be hand ground and polished to a sharp edge, and be of sufficient size and design to provide ample reserve capacity utilizing minimum horsepower.

The impeller clearance rings shall be bronze, easily renewable without replacing impeller or pump volute body, and of wraparound double labyrinth design for maximum efficiency.

The pump shaft shall be heat-treated, electric furnace, corrosion resistant, stainless steel, to be super-finished under packing with galvanic corrosion (zinc separators in packing) protection for longer shaft life. Pump shaft must be sealed with double lip oil seal to keep dirt and water out of drive unit.

### **DRIVE UNIT**

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

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

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

All gears drive and pump, shall be of highest quality electric furnace, chrome nickel steel. Bores shall be ground to size and teeth integrated, crown-shaved and hardened, to give an extremely accurate gear for

long life, smooth, quiet running, and higher load carrying capability. An accurately cut spur design shall be provided to eliminate all possible end thrusts.

The pump ratio shall be selected by the apparatus manufacturer to give maximum performance with the engine and transmission selected.

If drive unit is equipped with a power shift, the shifting mechanism shall be a heat-treated, hard-anodized aluminum power cylinder, with stainless steel shaft. An in-cab control for rapid shift shall be provided that locks in road or pump.

Three warning lights with plates shall be provided to alert the operator when the drive unit has fully shifted from road to pump position. Two lights shall be located on the cabs instrument panel and the other on the pump panel adjacent to the throttle.

A 3" clapper check valve shall be installed between the suction side of the pump and the tank-to-pump valve. This 3" clapper valve shall remove the possibility of a water surge expanding the booster tank.

Pump system shall have an integral discharge manifold system that allows a direct flow of water to all discharge valves.

One (1)  
22-F2-0420

Mechanical Seal - Hale

**MECHANICAL SEAL**

The midship pump shall be equipped with a high quality, spring loaded, and self-adjusting mechanical seal capable of providing a positive seal to atmosphere under all pumping conditions. This positive seal to atmosphere must be achievable under vacuum conditions up to 26 Hg (draft) or positive suction pressures up to 250 PSI.

The mechanical seal assembly shall be 2 inches in diameter and consist of a carbon sealing ring, stainless steel coil spring, Viton rubber boot, and a tungsten carbide seat, with a Teflon backup seal provided.

Only one mechanical seal shall be required, located on the first stage suction (inboard) side of the pump and be designed to be compatible with a one-piece pump shaft. A continuous cooling flow of water from the pump shall be directed through the seal chamber when the pump is in operation.

One (1)  
22-J8-6420

Primer - Manual Air, Trident 31.001.2 (1250+ GPM)

**PRIMING SYSTEM, PUMP**

A Trident Model 31.001.2 air operated priming system shall be installed. The unit shall be of all brass and stainless steel construction and designed for fire pumps of 1,250 GPM (4,690 LPM). Due to corrosion exposure no aluminum or vanes shall be used in the primer design. The primer shall be two-barrel design with 3/4" NPT connection to the fire pump.

The primer shall be mounted above the pump impeller so that the priming line will automatically drain back to the pump. The primer shall also automatically drain when the panel control actuator is not in

operation. The inlet side of the primer shall include a brass 'wye' type strainer with removable stainless steel fine mesh strainer to prevent entry of debris into the primer body.

Performance, Safety, and NFPA Compliance

The priming system shall be capable to a vertical lift to 22 inches of mercury and shall be fully compliant to applicable NFPA standards for vertical lift. The system shall create vacuum by using air from the chassis air brake system through a two-barrel multi-stage internal "venturi nozzles" within the primer body. The noise level during operation of the primer shall not exceed 75 Db.

Air Flow Requirements

The primer shall require a minimum of 15.6 cubic foot per minute air compressor and shall be capable of meeting drafting requirements at high idle engine speed. The air supply shall be from a chassis supplied 'protected' air storage tank with a pressure protection valve. The air supply line shall have a pressure protection valve set between 70 to 80 PSIG.

Primer Control

The primer control shall have a manually operated, panel mounted "push to prime" air valve; which will direct air pressure from the air brake storage tank to the primer body. To prevent freezing, no water shall flow to and from the panel control.

Power Requirements

To reduce the electrical power requirements on the fire apparatus the priming system shall be air powered. The system shall not require annual tear-down and maintenance, an electric motor, lubrication, belt drive, or clutch assembly.

Warranty

The primer shall be covered by a five-(5) year parts warranty.

One (1)  
22-P2-0220

Valve - Master Pump Drain

**VALVE, MASTER DRAIN**

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

One (1)  
22-P2-1220

Valve - Individual Drain, 3/4" 1/4 Turn

**VALVE, INDIVIDUAL DRAIN**

All lines shall drain through the master drain valve or shall be equipped with individual drain valves, easily accessible and labeled.

One-(1) individual quarter turn drain valve shall be furnished for each 1-1/2" or larger discharge port and each 2-1/2" gated auxiliary suction.

The drain/bleeder valves shall be located at the bottom of the side pump module panels.

One (1)  
22-R2-0220  
All drains and bleeders shall discharge below the running boards.  
Pump Test Points - Hale Pumps

**PUMP TEST POINTS**

One (1)  
22-R2-1820  
Two-(2) test plugs shall be pump panel mounted for testing of vacuum and pressures.  
Certification - Pump, 1500 GPM Pump

**PUMP CERTIFICATION, 1500 GPM**

The pump when dry, shall be capable of taking suction and discharging water in accordance with current NFPA 1901. The pump shall be tested at the manufacturer's facility by an independent, third party testing service. The conditions of the pump test shall be as outlined in current NFPA 1901. The tests shall include, at minimum, the pump test, the pumping engine overload test, the pressure control system test, the priming device tests, the vacuum test, and the water tank to pump flow test as outlined in current NFPA 1901.

A Piping hydrostatic test shall be performed as outlined in current NFPA 1901.

The pump shall meet and perform the following test to receive certification:

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

One (1)  
22-R4-0420  
Plate - Pump Test Certification

**PUMP TEST CERTIFICATION PLATE**

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

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

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

One (1)  
24-A2-1620  
Steamer Inlets - 6" w/Long Handle Cap, Left & Right Side

**STEAMER INLETS, 6"**

A 6" NST steamer inlet with removable screen and long handle cap shall be provided on the left and right side pump panels.



FC94 Pumpers

One (1) Valve - Intake Relief, TFT  
24-J8-0420

**RELIEF VALVE, INTAKE**

There shall be a TFT suction side relief valve provided in the pump system. The relief valve is adjustable from 50-250 psi and set at the factory at 125 psi. The discharge from the valve shall be directed toward the ground and away from the pump operator.

One (1) Tank-To-Pump - 3" Valve w/Push-Pull Control  
24-R2-0420

**TANK TO PUMP**

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

The tank to pump valve shall be a quarter turn fixed pivot design. The valve shall be controlled by a chrome push/pull locking "T" handle installed at the pump operator's panel.

One (1) Tank Fill - 2" Valve w/Push-Pull Control  
24-S6-0820

**TANK FILL**

A 2" tank fill line shall be provided, using a quarter turn full flow ball valve and high-pressure flexible hose. The valve shall be push pull controlled from the pump operator's panel.

One (1) Cooler - Engine, 1/2" Line w/ 1/4 Turn Valve  
24-T2-0420

**ENGINE COOLER**

The engine cooler shall be installed in-line from the discharge side of the pump, and installed in the engine cooling system. There shall be a 1/2", quarter turn valve installed thru the pump panel and shall be clearly labeled.

One (1) Cooler - Pump, 3/8" Line w/ 1/4 Turn Valve (1/2")  
24-T2-0620

**PUMP COOLER**

The pump shall have a 3/8" line installed from the pump discharge, to the water tank to cool the pump during long periods of pumping when water is not being discharged. The pump cooler shall be controlled from the pump operators panel by a 1/2" valve consisting of a cast bronze body with 1/4 turn chrome plated bronze ball, reinforced Teflon seals, and blow-out-proof stem rated to 600 PSI.

The valve shall be installed thru the pump panel and clearly labeled.

One (1) Plumbing - Stainless Steel  
24-W2-0220

**PLUMBING SYSTEM**

All inlet and outlet lines shall be plumbed with either, stainless steel pipe, flexible polypropylene tubing or synthetic rubber hose reinforced with hi-tensile polyester braid. All hoses shall be equipped with stainless steel couplings. All stainless steel hard plumbing shall be a minimum of a schedule 10 wall thickness. Where vibration or chassis flexing may damage or loosen piping or where a coupling is required for servicing, the piping shall be equipped with Victaulic or rubber couplings. Plumbing manifold bodies shall be ductile cast iron or stainless steel. All piping lines are to be drained through a master drain valve or shall be equipped with individual drain valves. All drain lines shall be extended with a hose to drain below the chassis frame. All water carrying gauge lines shall be of flexible polypropylene tubing. All piping, hose and fittings shall have a minimum of a 500 PSI hydrodynamic pressure rating.

One (1)  
24-W2-0620 Plumbing - Stainless Steel Foam Manifold

**STAINLESS STEEL FOAM MANIFOLD**

The foam manifold shall be constructed of stainless steel.  
Plumbing Finish - Natural

One (1)  
24-W4-0220

**PLUMBING FINISH**

The plumbing shall be natural finish and shall not be painted.  
Apparatus Valves - Elkhart Brass Unibody Series

One (1)  
26-A2-0420

**APPARATUS VALVES, ELKHART**

The apparatus valves (unless otherwise specified) shall be Elkhart Brass Unibody series. The valves shall be constructed of an all brass body, stainless steel ball with dual polymer seats; shall be capable of accepting any actuator without breaking the waterway; shall be capable of bi-directional flow and incorporating a self-locking ball; shall be capable of swinging out of the waterway for maintenance; shall not require lubrication of seats or any other internal waterway components; shall be manufactured and assembled in the United States and carry a 10 year manufacturer's warranty.

One (1)  
26-D2-0420 Suction - Left Side, 2-1/2" Valve w/Swing Control at Valve

**SUCTION(S), 2-1/2" LEFT PANEL**

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

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

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

One (1)  
26-G2-0220 Suction - Right Side, 2-1/2" Valve w/Swing Control at Valve

**SUCTION(S), 2-1/2" RIGHT PANEL**

One (1) 2-1/2" swing operated ball valve(s) shall be installed on the right side pump panel plumbed to the suction side of the pump with 2-1/2" piping. The suction(s) shall be equipped with a 2-1/2" FNST chrome inlet swivel, brass inlet strainer, chrome plug with chain and 3/4" drain valve. The control handle shall be located at the valve.

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

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

One (1)  
28-00-0220

All 2-1/2" Side Discharge Outlets Terminate 30-Degree Elbows

**DISCHARGE ELBOWS**

All 2-1/2" side discharge outlets shall terminate with chrome-plated 30-Degree elbows with 2-1/2" MNST threads and chrome vented caps/chains.

The caps shall automatically release pressure in the discharge outlet before the threads are completely disengaged unless the outlet and the cap are equipped with drains or bleeder valves.

One (1)  
28-A6-0220

Discharge - Front Bumper w/ Swivel - thru Tread Plate (PS)

**DISCHARGE, FRONT BUMPER**

There shall be one-(1) front discharge installed thru the gravelshield passenger's side outboard of the frame rail.

One (1)  
28-A8-0220

Discharge - Front Bumper, 2" Valve w/Push Pull Control

The front bumper discharge shall terminate with a 90-degree swivel elbow, 2" FNPT x 1-1/2" MNST. One-(1) 2" brass valve with 3/4" drain shall be installed on the discharge side of the pump plumbed to the front swivel with flexible high-pressure hose and victaulic stainless steel couplings tested to 1200 PSI.

The front discharge shall be push/pull controlled at the pump operator's panel.

One (1)  
28-A8-6020

Discharge - Swivel Stop, Tread plate

A tread plate stop shall be provided preventing the front bumper discharge swivel from incidental contact with the cab.

One (1)  
28-D4-0420

Crosslays (2) - Double Lay, 2" Valve w/Push Pull Control

**CROSSLAYS, 1-3/4" DOUBLE LAY**

Two-(2) pre-connected crosslay compartments shall be provided above the pump module. Each crosslay bed shall accommodate 200' of 1-3/4" double jacket hose. Stainless steel nylon guide rollers shall be installed at each end with stainless steel scuff plates around the perimeter to protect the painted surface.

One-(1) 2" ball valve with 90-degree mechanical swivel shall be installed for each crosslay. The valve shall be plumbed to the crosslay with 2" high-pressure flexible hose and stainless steel couplings. The high pressure hose shall be tested to 1200 PSI. The crosslays shall be push pull controlled at the pump operator's panel.

The crosslays shall be equipped with a 3/4 quarter-turn drain valve.

A safety sign FAMA22, which warns of the need to secure hose, shall be visible to personnel at the hose storage area.

One (1)  
28-D8-1220 Cover - Aluminum w/End Flaps, Crosslays

**CROSSLAY COVER, ALUMINUM**

There shall be one-(1) crosslay cover provided. The cover shall be constructed of 1/8" (.125") aluminum tread plate with a stainless steel piano hinge, chrome lift handles and two-(2) hook latches.

A safety sign FAMA22, which warns of the need to secure hose, shall be visible to personnel at the hose storage area.

One (1)  
28-D8-2220 End Flaps - Hypalon w/Snaps, Crosslays

The Hypalon end flaps shall be secured at the bottom using pushpins. The cover prevents hose from inadvertently deploying during normal operations meeting the current NFPA requirements.

One (1)  
28-D8-6220 Cover/End Flaps Color: Black

The cover and/or end flaps shall be black in color.

One (1)  
28-H8-0420 Discharges (2) - Left Side, 2-1/2" Valve w/Push-Pull Control

**DISCHARGES, 2-1/2" LEFT SIDE**

There shall be two-(2) discharge outlets with a 2-1/2" valve on the left side pump panel. The outlets shall be push pull controlled from the operator's panel and terminate with 2-1/2" MNST threads.

One (1)  
28-K4-0220 Discharge - Right Side, 2-1/2" Valve w/Push-Pull Control

**DISCHARGE, 2-1/2" RIGHT SIDE**

There shall be one-(1) discharge outlet with a 2-1/2" valve on the right side pump panel. The outlet shall be push pull controlled from the operator's panel and terminate with 2-1/2" MNST threads.

One (1)  
28-K4-4020 Discharge - Right Side, 3" Valve w/Push Pull Control

**DISCHARGE, 3" RIGHT SIDE**

There shall be one-(1) discharge outlet with a 3" valve on the right side pump panel. The outlet shall be push pull controlled from the operator's panel and terminate with 3" MNST threads.

One (1)  
28-Q2-0220 Discharge - Deck Gun, 3" Valve w/Push Pull Control

**DECK GUN PLUMBING, 3"**

A 3" deck pipe shall be installed above the pump in such a manner that a monitor can be mounted and used effectively. The piping shall be installed securely so no movement develops when the line is charged. The piping shall terminate with 3" NPT threads and a 4-bolt flange for mounting a monitor. The 3" valve shall be push pull controlled from the operator's panel.

One (1)  
28-W2-1020

Discharge - Right Rear, 2-1/2" Valve w/Push-Pull Control

**DISCHARGE, 2-1/2" RIGHT REAR**

There shall be one-(1) discharge outlet with a 2-1/2" valve plumbed to the right rear of the apparatus. The outlet shall be push pull controlled from the operator's panel and terminate with 2-1/2" MNST adapter. Elbow - 2-1/2 FNST x 2-1/2" MNST Chrome 30 Degree, Trident 01.010.0

One (1)  
28-W8-8020

**30 DEGREE ELBOW(S) - 2-1/2" FNST X 2-1/2" MNST**

There shall be one (1) Trident model 01.010.0 2-1/2" FNST x 2-1/2" MNST chrome plated elbow(s) supplied with the apparatus. The elbow(s) shall have a 30 degree turn down. Foam System - FRC TurboFoam TFC226-030

One (1)  
30-C2-0420

**FOAM SYSTEM**

Fire Research TurboFoam model TFC226-030 direct injection foam proportioning system shall be installed. The system kit shall include a control module, a foam concentrate pump assembly with an electric motor, a discharge flow sensor with mount for a 3.0" pipe, check valves, foam concentrate strainer, cables, and instruction plates including operations, system diagram, and specifications.

The system shall provide the following capabilities:

Foam concentrate pump:	2.6 GPM	
Maximum injection pressure:	400 PSI	
	<u>A Foam Program</u>	<u>B Foam Program</u>
Proportioning ratio:	0.1 to 1.0 %	0.5 to 10%

The microprocessor controlled system shall automatically maintain a selected foam percent mixture at the pump discharge regardless of water flow fluctuations. It shall monitor the water flow through the discharge and control the flow rate of foam concentrate from the foam tank. The pump shall inject concentrate under pressure into the discharge side of the pump to create the correct foam solution. Discharge flow rate and foam concentrate percent shall be displayed. Total water and total foam concentrate flow shall be displayed with the push of a button.

The control module shall be panel mounted, waterproof, and have dimensions not to exceed 4 7/8" high by 4 7/8" wide by 2 1/4" deep. The push button controls, digital discharge flow rate, foam percent, and message displays shall be located on the front of the control module. A USB port shall be accessed from the rear.

The foam pump assembly shall have an overall length less than 19 1/2", width less than 10", and a height less than 8 7/8". The components of the assembly shall be mounted to a base and include a pump control box, a pump with an electric motor, a pressure relief valve, and a calibration bypass valve. The pump shall be a triplex plunger pump constructed of a die-cast body with cooling fins, a forged brass head, solid ceramic plungers, and viton seals. The pump shall have a custom electric washguard motor specifically designed for wet environments. The 1/2 hp pump motor shall operate at 12 volts DC and draw 55 amps.

One (1)  
30-J2-2020

Gauge - Class A Foam, FRC Tank Vision Pro WLA360-A00

**GAUGE, FOAM LEVEL**

A Fire Research TankVision Pro model WLA360-A00 tank indicator kit shall be installed on the pump operator's panel. The kit shall include an electronic indicator module, a pressure sensor, a 10' sensor cable and a tank vent. The indicator shall show the volume of Class A foam concentrate in the tank on nine (9) easy to see super bright RGB LEDs. A wide view lens over the LEDs shall provide for a viewing angle of 180 degrees. The indicator case shall be waterproof, manufactured of Polycarbonate/Nylon material, and have a distinctive green label.

The program features shall be accessed from the front of the indicator module. The program shall support self-diagnostics capabilities, self-calibration, six (6) programmable colored light patterns to display tank volume, adjustable brightness control levels and a datalink to connect remote indicators. Low water warnings shall include flashing LEDs at 1/4 tank, down chasing LEDs when the tank is almost empty, and an output for an audio alarm.

One (1)  
30-K8-4220

Tank Switch (1) Low Level - Horizontal Mount

**LOW TANK SWITCH**

A low level-tank sensor switch shall be installed in the foam tank. The sensor shall be mounted to indicate to the Display Control Module when the foam cell has approximately five (5) gallons of concentrate left.

One (1)  
30-R8-0220

NFPA Test - Foam Proportioning Systems

**FOAM PROPORTIONING SYSTEM TEST**

**NFPA 1901 PERFORMANCE REQUIREMENTS**

The proportioning system shall be capable of proportioning foam concentrate in accordance with the foam concentrate manufacturer's recommendation for the type of foam concentrate used in the system over the system's design range of flow and pressure. The foam proportioning systems water flow characteristics and the range of proportioning ratios shall be specified.

The foam system shall comply with NFPA 1901 Chapter 17.0 as it relates to the specified system.

**FOAM TANK PIPING**

The foam supply line shall be non-collapsible. There shall be a means provided to prevent water backflow in to the foam proportioning system and storage tank(s).

Either a filter or strainer provided on the foam concentrate supply side of the foam proportioning to prevent any debris that may affect the operation of the foam proportioning system from entering the system. The strainer assembly shall consist of a removable straining element, housing, and retainer. The strainer assembly shall allow full flow capacity of the foam supply line.

### **FLUSHING**

Foam concentrate system flush line(s) shall be provided as required by the foam system manufacturer. The design shall incorporate a means to prevent water backflow into the concentrate tank or water tank during the flushing operation. Where the foam proportioning system is connected to more than one (1) foam storage tank, provisions shall be made to flush all common lines to avoid contamination of dissimilar foam concentrates.

### **CONTROLS FOR FOAM SYSTEM**

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

All foam-proportioning systems that require flushing shall provide controls, which enable the operator to flush the system in accordance with the foam manufacturer's instructions.

Foam proportioning systems that incorporate foam concentrate metering valves shall have each metering valve calibrated to indicate the rate(s) of flow of the foam concentrate proportioning available as determined by the design of the system.

Foam proportioning systems that incorporate automatic proportioning features shall be equipped with controls, which enable the operator to isolate the automatic feature and operate the system in a manual mode.

### **NAMEPLATE, LABELS, INSTRUCTION SPECIFICATIONS**

There shall be a nameplate provided that is clearly marked with the identification and function of each control gauge and indicator related to the foam proportioning system.

There shall be a label provided on the operator's panel that identifies the type(s) of foam concentrate(s) the system is designed to use. This label shall state the minimum/maximum foam-proportioning rate at the minimum/maximum foam proportioning rated system flow and pressure.

Foam proportioning system instruction plate shall be provided. This includes a minimum piping schematic of the system and basic operating instructions.

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

### **FOAM PROPORTIONING SYSTEM TESTING**

The apparatus manufacturer shall test the accuracy of the foam proportioning system prior to delivery of the apparatus.

If the manufacturer's rated proportioning ratio is below 3%, the foam system shall proportion foam concentrate within 0% /+40% of the manufacturer's rated proportioning ratio across the manufacturer stated range of water flow and pressure.

If the manufacturer's rated proportioning ratio is above 3%, the foam system shall proportion foam concentrate within 0% /+40% of the manufacturer's rated proportioning ratio or 1 percentage point, whichever is less across the manufacturer's stated range of water flow and pressure.

One (1)  
30-S2-0620 10

Foam Tank No. 1 - Polypropylene, 30 Gallons

### **FOAM TANK NO. 1**

The foam tank shall have a capacity of 30 gallons designed as an integral part of the water tank and 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 colored material (yellow, green and black) 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.

One (1)  
30-S2-2220

Foam Refill System - Foam Pro Power Fill

### **FOAM TANK NO. 1 REFILL SYSTEM, FOAM PRO POWER FILL**

The apparatus shall be equipped with an electric, automatic, concentrate refill system. System shall operate independently of the foam proportioning allowing simultaneous sue. Refill operation shall not require apparatus or fire pump to be running. They system shall be capable of handling Class A or Class B foam concentrates, emulsifiers, gels and decontamination concentrates. The apparatus shall be plumbed from the externally accessed intake/flush ports to the concentrate cell following manufacturer's recommendations. The refill operation shall be based on direct measurement of concentrate level in tank. System must be capable of automatically stopping when cell is full and include a manual override feature. The system shall be equipped with an electronic control suitable for installation on the pump panel. Incorporate within the control shall be a microprocessor that receives input from the system while controlling foam concentrate pump output. An all bronze three-way valve shall be included to allow the operator to flush the system after use. Valve control, intake, and flush ports shall be located within corresponding panel plate.



The system shall enable the operator to perform the following control/operation functions and status indicators for the refill operation:

- Provide push button start/stop control of foam refill
- Solid green light advises operator concentrate cell is full
- Flashing green indicates system is running
- Green light off, system off
- Allow override of "full tank" condition
- Provide a means to flush the pump and intake piping

System shall include a 12 V electric motor driven, positive displacement concentrate pump. Pump deliver minimum flow of 10 GPM at 20 PSI with all concentrates currently utilized in fire apparatus. Pump body to be of all bronze construction and other wetted components and piping to be constructed of non-corrosive materials. The system shall draw a maximum of 38 amps at 12VDC. A pump/motor solenoid (mounted on the base of the pump) shall receive signals from the computer control display and readings when the concentrate tank is full and stop operation to prevent overflow.

Components of the complete refill system shall include:

- Operator control and display with Weather- Pac connectors
- Refill/flush, quick connect cam-lock fittings and cap
- Check valves
- Pump/motor assembly and solenoid
- Strainer
- Tank level switch
- Three way fill/ flush valve
- Stainless steel pick up wand and 6 feet of reinforced suction hose, 1" in diameter to allow maximum flow
- Panel placards

An installation and operations manual shall be provided, along with a one (1) year limited warranty. When two types of concentrates are to be used, a separate refill system must be specified for each.

One (1)  
30-T2-0200

FOAM OUTLET LOCATIONS:

**FOAM OUTLETS**

Foam shall be plumbed to the following outlets:  
Foam Outlet - Discharge Front Bumper

One (1)  
30-T2-0420

## FC94 Pumpers

- One (1)  
30-T2-0620  
Front Bumper Discharge  
Foam Outlet - Crosslay No. 1
- One (1)  
30-T2-0820  
No. 1 Crosslay  
Foam Outlet - Crosslay No. 2
- One (1)  
30-T6-2220  
No. 2 Crosslay  
Foam Outlet - Discharge Rear of Body, Right Side
- One (1)  
32-E2-2020  
Rear of Body Right Side  
Return Line - Fill Subsurface

### **FILL SUBSURFACE/RETURN LINE**

There shall be one-(1) subsurface/return line installed in the booster tank. The subsurface/return line shall prevent aeration of the water in the booster tank under low water conditions. The subsurface/return line piping shall be of the same size as the "Tank Fill".

- One (1) == Bodies - Pumper LTT Side Mount Extruded - 421.001 04/02/21 ==

- One (1)  
32-C2-2020  
Water Tank - Polypropylene, 1000 Gallons (T)

### **WATER TANK**

The tank shall have a capacity of 1000 U.S. gallons and shall be constructed of PT3™ polypropylene material. This material shall be a non-corrosive stress relieved thermoplastic and UV stabilized for maximum protection. Tank shell thickness may vary depending on the application and may range from ½ to 1" as required. Internal baffles are generally 3/8" in thickness.

### **ISO CERTIFICATION**

The tank must be "T" shaped in design and fabricated by a tank manufacturer that is ISO 9001:2008 certified in each of its locations. The ISO certification must be to the current standard in effect at the time of the design and fabrication of the tank.

### **DESIGN**

Each tank is designed to the customer's specification and/or drawing submittal. An approval drawing is sent to the customer prior to commencing manufacturing. Upon receipt of the signed approval drawing, the tank is scheduled for production.

### **CONSTRUCTION**

The booster and/or foam tank shall be of a specific configuration and is so designed to be completely independent of the body and compartments. Joints and seams shall be fused using nitrogen gas as

required and tested for maximum strength and integrity. The tank construction shall include PolyProSeal™ technology wherein a sealant shall be installed between the plastic components prior to being fusion welded. This sealing method shall provide a liquid barrier offering leak protection in the event of a weld compromise. The top of the booster tank is fitted with removable lifting assembly designed to facilitate tank removal. The transverse and longitudinal swash partitions shall be manufactured of a minimum of 3/8" PT3™ polypropylene. All partitions shall be equipped with vent and air holes to permit movement of air and water between compartments. The partitions shall be designed to provide maximum water flow.

All swash partitions interlock with one another and are completely fused to each other as well as to the walls of the tank. All partitions and spacing shall comply with NFPA 1901. The walls shall be welded to the floor of the tank providing maximum strength as part of the tank's unique Full Floor Design™. Tolerances in design allow for a maximum variation of 1/8" on all dimensions.

### **WATER FILL TOWER AND COVER**

The tank shall have a combination vent and manual fill tower. The fill tower shall be constructed of 1/2" PT3™ polypropylene and shall be a minimum dimension of 8" x 8" outer perimeter. The fill tower shall be blue in color indicating that it is a water-only fill tower. The tower shall be located in the left front corner of the tank unless otherwise specified by the tank manufacturer to the purchaser. The tower shall have a 1/4" thick removable polypropylene screen and a PT3™ polypropylene hinged cover. The capacity of the tank shall be engraved on the top of the fill tower lid. Inside the fill tower there shall be a combination vent/overflow pipe. The vent overflow shall be a minimum of schedule 40 polypropylene pipe with a minimum I.D. of 4" that is designed to run through the tank, and shall be piped to discharge water behind the rear wheels as required in NFPA 1901 so as to not interfere with rear tire traction. The tank cover shall be constructed of 1/2" thick PT3™ polypropylene and UV stabilized, to incorporate a multi-piece locking design, which allows for individual removal and inspection if necessary. The tank cover(s) shall be flush or recessed 3/8" from the top of the tank and shall be fused to the tank walls and longitudinal partitions for maximum integrity. Each one of the covers shall have hold downs consisting of 2" minimum polypropylene dowels spaced a maximum of 40" apart. These dowels shall extend through the covers and shall assist in keeping the covers rigid under fast filling conditions. A minimum of two lifting dowels shall accommodate the necessary lifting hardware.

### **SUMP**

There shall be one (1) sump standard per tank. The sump shall be constructed of a minimum of 1/2" PT3™ polypropylene and be located in the left front quarter of the tank, unless specified otherwise. On all tanks that require a front suction, a 3" schedule 40 polypropylene pipe shall be installed that shall incorporate a dip tube from the front of the tank to the sump location. The sump shall have a minimum 3" NPT threaded outlet on the bottom for a drain plug per NFPA. This shall be used as a combination clean-out and drain. All tanks shall have an anti-swirl plate located approximately 3" above the inside floor.

### **OUTLETS**

There shall be two (2) standard tank outlets: one for the tank-to-pump suction line, which shall be sized to provide adequate water flow to the pump; and, one for tank fill line, which shall be sized according to the NFPA minimum size chart for booster tanks. All tank fill couplings shall be backed with flow deflectors to break up the stream of water entering the tank, and be capable of withstanding sustained fill rates of up to 1000 GPM. The addition of rear suction fittings, nurse valve fittings, dump valve fittings, and through-the-tank sleeves to accommodate rear discharge piping must be specified. All auxiliary outlets and inlets must meet all NFPA guidelines in effect at the time of manufacture.

### **MOUNTING**

The UPF Poly-Tank® III shall rest on the body cross members in conjunction with such additional cross members, spaced at a distance that would not allow for more than 530 square inches of unsupported area under the tank floor. In cases where overall height of the tank exceeds 40 inches, cross member spacing must be decreased to allow for not more than 400 square inches of unsupported area. The tank must be isolated from the cross members through the use of hard rubber strips with a minimum thickness and width dimension of 1/4" x 1" and a Shore A Hardness of approximately 60 durometer. The rubber must be installed so it shall not become dislodged during normal operation of the vehicle. Additionally, the tank must be supported around the entire bottom outside perimeter and captured both in the front and rear as well as side to side to prevent tank from shifting during vehicle operation. A picture frame type cradle mount with a minimum of 2" x 2" x 1/4" mild steel, stainless steel, or aluminum angle shall be provided or the use of corner angles having a minimum dimension of 4" x 4" x 1/4" by 6" high are permitted for the purpose of capturing the tank. Although the tank is designed on a free floating suspension principle, it is required that the tank have adequate vertical hold down restraints to minimize movement during vehicle operation. If proper retention has not been incorporated into the apparatus hose floor structure, an optional mounting restraint system shall be located on top of the tank, half way between the front and the rear on each side of the tank. These stops can be constructed of steel, stainless steel or aluminum angle having minimum dimensions of 3" x 3" x 1/4" and shall be approximately 6" to 12" long. These brackets must incorporate rubber isolating pads with a minimum thickness of 1/4" inch and a hardness of 60 durometer affixed on the underside of the angle. The angle should then be bolted to the body side walls of the vehicle while extending down to rest on the top outside edge of the upper side wall of the tank. Hose beds floors must be so designed that the floor slat supports extend full width from side wall to side wall and are not permitted to drop off the edge of the tank or in any way come in contact with the individual covers where a puncture could occur. Tank top must be capable of supporting loads up to 200 lbs. per sq. foot when evenly distributed. Other equipment such as generators, portable pumps, etc. must not be mounted directly to the tank top unless provisions have been designed into the Poly-Tank® III for that purpose. The tank shall be completely removable without disturbing or dismantling the apparatus structure.

### **CAPACITY CERTIFICATION**

All water and foam tanks shall be tested and certified as to capacity on a calibrated and certified tilting scale. Each tank shall be weighed empty and full to provide precise fluid capacity. Each Poly-Tank® III is delivered with a Certificate of Capacity delineating the weight empty and full and the resultant capacity based on weight. Engineering estimates for capacity calculations shall not be permitted for capacity certification.

**TANKNOLOGY™ TAG**

A tag shall be installed on the apparatus in a convenient location and contain pertinent information including a QR code readable by commercially available smart phones. The information contained on the tag shall include the capacity of the water and foam (s), the maximum fill and pressure rates, the serial number of the tank, the date of manufacture, the tank manufacturer, and contact information. The QR code shall allow the user to connect with the tank manufacturer for additional information and assistance. Certification - NFPA Water Tank Size

One (1)  
32-D8-0420

**WATER TANK SIZE CERTIFICATION**

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

One (1)  
34-A2-1220 Gauge - Water Level, Tank Vision Pro WLA300-A00

**GAUGE, WATER LEVEL**

A Fire Research TankVision Pro model WLA300-A00 tank indicator kit shall be installed on the pump operator's panel. The kit shall include an electronic indicator module, a pressure sensor, and a 10' sensor cable. The indicator shall show the volume of water in the tank on nine (9) easy to see super bright RGB LEDs. A wide view lens over the LEDs shall provide for a viewing angle of 180 degrees. The indicator case shall be waterproof, manufactured of Polycarbonate/Nylon material, and have a distinctive blue label.

One (1)  
52-A2-1820 Body - 96" Wide, Extruded Aluminum

The program features shall be accessed from the front of the indicator module. The program shall support self-diagnostics capabilities, self-calibration, six (6) programmable colored light patterns to display tank volume, adjustable brightness control levels and a datalink to connect remote indicators. Low water warnings shall include flashing LEDs at 1/4 tank, down chasing LEDs when the tank is almost empty, and an output for an audio alarm.

**APPARATUS BODY, 96" WIDE**

The 96" wide apparatus body and sub frame shall be constructed entirely of marine grade aluminum plate and extrusions.

One (1)  
52-A6-4020 Body Sub frame - Extruded Aluminum

**BODY SUBFRAME**

The main body support cross member extrusions shall be 3" x 4" 6061T6 aluminum alloy, double "I" beam with a wall thickness of 7/16" (.438"). These cross members shall extend the full width of the body to support the compartment framing. The cross members shall be welded to a 3/4" (.750") x 3" solid aluminum, 6061T6 aluminum (alloy frame rail) extrusion. The frame rail extrusion shall be shaped in contour with the chassis frame rails. The frame rail extrusion shall be mounted over a 1/2" (.5")

thickness, reinforced rubber cushion to isolate the aluminum sub frame from the chassis steel frame rails. The apparatus body structure shall be securely fastened to the chassis frame rails with a minimum of six-(6) 5/8" (.625") cross member OD, steel U-bolts. The main body support cross member shall have a gusset above and below each cross member. The gussets shall be constructed of 2.0" x 4.0" 6063T6 aluminum alloy extrusion with a .190" wall thickness. The gussets shall be continuously welded with 5356 aluminum alloy welding wire to add support to the body sidewalls. The main body supports and the longitudinal double "I" beam supports shall have a "C" shaped rubber tank cushion installed on the top of each member. This rubber extrusion shall conform to the shape of the double "I" beam extrusion to keep the tank cushion in place. This method is used to prevent damage to the tank.

Absolutely no pop-rivets, screws or any other hardware shall be used to hold the rubber tank cushion in place.

One (1)  
52-A6-6020 Body/Compartment Construction - 96" Wide Body

### **BODY CONSTRUCTION**

The complete apparatus body structure shall be an all welded construction and be free from nuts, bolts and other fasteners. Upon completion of the weldments, the body shall be completely sanded and deburred for removal of all sharp edges.

The body framework shall be formed from beveled aluminum alloy extrusions and electrically seam welded at each joint using 5356 aluminum alloy welding wire. Body sides shall be formed from 5052 H-32 (marine grade) smooth aluminum plates. The horizontal surfaces above the compartment tops shall be constructed from aluminum tread plate.

The horizontal and vertical frame member extrusions shall be 2.0" x 4.0" with a .190" wall thickness. The extrusion shall be made from 6063T6 aluminum alloy. This extrusion shall have .190" outside radius corners. The longitudinal frame member, below the lower compartments shall be a 2.0" x 4.0" 6063T6 aluminum alloy extrusion with .190" radius corners. Each body corner shall be a 3.5" x 9-3/4" 6063T6 extruded aluminum section with .210" wall thickness, and shall be welded as an integral part of the body. This extrusion shall have a 1" corner radius.

### **COMPARTMENT CONSTRUCTION**

The compartment sidewalls shall be of one-piece construction. The walls shall be formed from 3/16" (.1875") 5052 H-32 (marine grade) smooth aluminum plate. All compartment floors shall be formed from 3/16" (.1875") aluminum tread plate. The floors shall be welded in place with a continuous weld all around the perimeter to insure maximum strength.

The compartment seams shall be sealed with permanent pliable silicone caulking.

Each compartment shall be vented through a 3" wide x 15" high louver that is machined stamped in a panel located in each body corner extrusion. The panel shall be removable to provide access to service wiring and other mounted components.

One (1)  
52-A6-8020 Compartment Tops/Catwalk - Standard

**COMPARTMENT TOPS/CATWALK**

The external compartment tops shall be constructed of 1/8" (.125") aluminum tread plate. The tops shall have a formed edge, which serves as a drip rail for the compartments below. The compartment tops shall be secured with stainless steel screws to allow for ease of removal for access to the bodies wiring harnesses.

One (1)  
52-A8-0220 Wheel Well Panels & Fenders - Body, Aluminum Tread plate

**WHEEL WELL PANELS, ALUMINUM TREADPLATE**

The wheel well shall be constructed from 2" x 4" x .190" wall thickness. The extrusion shall be made from 6063T6 aluminum alloy and have .190" outside radius corners. The extrusion shall be slotted the full length to permit an internal fit of 3/16" (.187") aluminum tread plate panels. The wheel well liners shall be constructed of 3003 H-14 smooth aluminum plates. They shall be bolted in place for ease of maintenance. The wheel well fenderettes shall be constructed of a #304 Stainless steel with a #7 polished finish.

A deflection shield shall be mounted to the body sub frame to keep road debris from entering the water tank area.

One (1)  
52-A8-1020 Hose Bed - 67-1/2" Wide

**HOSEBED**

The hose bed sides shall be constructed of 3/16" (.1875") 5052 H-32 (marine grade) smooth aluminum plate welded to the extruded framework. There shall be a 3" x 3.5" 6063T6 aluminum extrusion with .190" wall thickness running the entire length of the hose bed at the top for structural rigidity. The hose bed decking shall be constructed from anodized aluminum extrusions. The extrusions shall be 3/4" (.750") x 8.125" and have 3/4" (.750") x 3.00" hat channel attached to the underside to form a one-piece grid. The entire deck shall be removable, in one piece, to allow ease of serviceability to the tank. The hose bed shall include an extrusion across the front and rear of the compartment for the installation of adjustable hose bed dividers.

The fire apparatus hose body shall be 67-1/2" wide and shall contain a minimum of 79 cubic feet of storage.

A safety sign FAMA22, which warns of the need to secure hose, shall be visible to personnel at the hose storage area.

One (1)  
52-D8-0420 Compartments- Left Side, Rescue Style (36/58/44 w/70" Interior Height)

**COMPARTMENTS, LEFT SIDE**

Three (3)  
52-F2-6030 Compartment Doors - Left Side Roll Up, ROM Satin Finish

**COMPARTMENT DOORS, LEFT SIDE ROLL UP**

R•O•M Series IV roll-up shutter doors shall be installed on the left side compartments of the apparatus as specified.

Shutter slats will feature a double wall extrusion 0.315” thick with a concave interior surface to minimize loose equipment jamming the shutter door closed. Shutter slats will feature an interlocking end shoe to prevent side to side binding of the shutter door during operation. Slats must have interlocking joints with an inverted locking flange. Slat inner seal shall be a one piece PVC extrusion; seal design will be such to prevent metal to metal contact while minimizing dirt and water from entering the compartment.

Shutter door track shall be one piece design with integral overlapping flange to provide a clean finished look without the need of caulk. Door track shall feature an extruded Santoprene rubber double lip low profile side seal with a silicone co-extruded back to reduce friction during shutter operation.

Shutter bottom rail shall be a one piece double wall extrusion with integrated finger pull. Finger pull shall be curved upward with a linear striated surface to improve operator grip while operating the shutter door. Bottom rail shall have a smooth contoured interior surface to prevent loose equipment from jamming the shutter door. Bottom rail seal shall be made from Santoprene; it will be a double “V” seal to prevent water and debris from entering compartment. Bottom rail lift bar shall be a one piece “D” shaped aluminum extrusion with linear striations to improve operator grip during operation. Lift bar shall have a wall thickness of 0.125”. Lift bar shall be supported by no less than two pivot blocks; pivot blocks shall be constructed from Type 66 Glass filled reinforced nylon for superior strength. Bottom rail end blocks shall have incorporated drain holes which will allow any moisture that collects inside the extrusion to drain out.

Shutter door shall have an enclosed counter balance system. Counter balance system shall be 4” in diameter and held in place by 2 heavy duty 18 gauge zinc plated plates. Counter balance system shall have 2 over-molded rubber guide wheels to provide a smooth transition from vertical track to counter balance system; no foam material of any kind shall be permitted or used in this area.

The shutter door assembly shall be manufactured and assembled in the United States.

There shall be an aluminum drip rail above each compartment door with a built in replaceable wiper seal.

There shall be an anodized aluminum sill plate installed at the bottom of the compartment door.

The outside door shall have a natural finish.

Three (3)  
52-F2-6420

Keyed Lock - Roll-Up Doors

**KEYED LOCK, ROLL UP DOOR**

There shall be three (3) stainless steel lock(s) with keys installed on the specified compartment roll-up door(s).

Three (3)  
52-F2-6620

Pull Down Strap - Compartment Door

**PULL DOWN STRAP(S), COMPARTMENT DOOR**

There shall be three (3) pull-down strap(s) provided on the high side compartment door(s) to aid in closing the door(s).



One (1) Compartments - Right Side, Rescue Style (36/58/44 w/70" Interior Height)  
52-H6-2220

**COMPARTMENTS, RIGHT SIDE**

Three (3) Compartment Doors - Right Side Roll Up, ROM Satin Finish  
52-J6-2030

**COMPARTMENT DOORS, RIGHT SIDE ROLL UP**

R•O•M Series IV roll-up shutter doors shall be installed on the right side compartments of the apparatus as specified.

Shutter slats will feature a double wall extrusion 0.315" thick with a concave interior surface to minimize loose equipment jamming the shutter door closed. Shutter slats will feature an interlocking end shoe to prevent side to side binding of the shutter door during operation. Slats must have interlocking joints with an inverted locking flange. Slat inner seal shall be a one piece PVC extrusion; seal design will be such to prevent metal to metal contact while minimizing dirt and water from entering the compartment.

Shutter door track shall be one piece design with integral overlapping flange to provide a clean finished look without the need of caulk. Door track shall feature an extruded Santoprene rubber double lip low profile side seal with a silicone co-extruded back to reduce friction during shutter operation.

Shutter bottom rail shall be a one piece double wall extrusion with integrated finger pull. Finger pull shall be curved upward with a linear striated surface to improve operator grip while operating the shutter door. Bottom rail shall have a smooth contoured interior surface to prevent loose equipment from jamming the shutter door. Bottom rail seal shall be made from Santoprene; it will be a double "V" seal to prevent water and debris from entering compartment. Bottom rail lift bar shall be a one piece "D" shaped aluminum extrusion with linear striations to improve operator grip during operation. Lift bar shall have a wall thickness of 0.125". Lift bar shall be supported by no less than two pivot blocks; pivot blocks shall be constructed from Type 66 Glass filled reinforced nylon for superior strength. Bottom rail end blocks shall have incorporated drain holes which will allow any moisture that collects inside the extrusion to drain out.

Shutter door shall have an enclosed counter balance system. Counter balance system shall be 4" in diameter and held in place by 2 heavy duty 18 gauge zinc plated plates. Counter balance system shall have 2 over-molded rubber guide wheels to provide a smooth transition from vertical track to counter balance system; no foam material of any kind shall be permitted or used in this area.

The shutter door assembly shall be manufactured and assembled in the United States.

There shall be an aluminum drip rail above each compartment door with a built in replaceable wiper seal.

There shall be an anodized aluminum sill plate installed at the bottom of the compartment door.

The outside door shall have a natural finish.

Three (3) Keyed Lock - Roll-Up Doors  
52-J6-2420

**KEYED LOCK, ROLL UP DOOR**

There shall be three (3) stainless steel lock(s) with keys installed on the specified compartment roll-up door(s).

Three (3)  
52-J6-2620 Pull Down Strap - Compartment Door

**PULL DOWN STRAP(S), COMPARTMENT DOOR**

There shall be three (3) pull-down strap(s) provided on the high side compartment door(s) to aid in closing the door(s).

One (1)  
52-J8-0420 Compartment - Center Rear, Standard Height

**COMPARTMENT, CENTER REAR**

B1

There shall be one-(1) compartment installed at the center rear of the apparatus. The compartment shall have an interior dimension of approximately 46" wide x 28" high.

One (1)  
52-J8-2220 Compartment Door - Rear Hinged, LOCKING Flush Look

**COMPARTMENT DOOR, REAR HINGED**

The rear compartment door shall be constructed of 3/16" (.1875") smooth aluminum plate with the inner pan stitch welded in place from 1/8" (.125") 5052-H32 smooth aluminum plate.

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

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

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

The compartment doors shall be locking and keyed alike.  
Rear Body Construction - Flat Back w/Recessed Rear Step

One (1)  
52-J8-6620

**REAR BODY CONSTRUCTION, FLAT BACK**

The rear of the apparatus shall be flat back design. No beavertails shall be installed on the unit. The lower area of the compartments behind the rear wheels shall extend into the tailboard area to create and additional stepping surface to gain access to the hose bed.

One (1)  
52-J8-8820

The rear tailboard shall be recessed between these compartments.  
Step - Intermediate Rear, Aluminum Tread Plate

**STEP, INTERMEDIATE REAR**

The intermediate rear step shall be constructed of 3/16" (.1875") aluminum tread plate.

One (1)  
60-A2-4820

All running board and step surfaces shall comply with NFPA 1901.  
Vertical Load Test - Body

**VERTICAL LOAD TEST, APPARATUS BODY**

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

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

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

Three (3)  
60-A2-8020

Compartment - Full Depth, Per Compartment

**FULL DEPTH COMPARTMENT(S)**

The specified compartment(s) of the apparatus shall have full-depth configurations that extend the interior depth of the compartment to match to lower compartment depths. The exact dimensions and storage capacity is completely described in the "Compartment" section of the specification.

One (1)  
62-A2-6020

Compartment - Pike Pole/Ladder Storage, Right Side Beside Tank

**COMPARTMENT, LADDER**

There shall be one-(1) equipment storage compartment installed beside the tank on the right side constructed of 1/8" (.125) smooth aluminum plate for the storing of NFPA required equipment. Individual internal compartments shall house one-(1) 24' extension ladder, one-(1) 14' roof ladder, one-(1) 10' folding ladder and two-(2) pike poles with silencing pads made from Polypropylene installed on each compartment floor to assist in the loading and unloading of the required equipment.

The compartment shall have vertically hinged door constructed from 1/8" (.125) smooth aluminum plate with stainless steel piano hinge and paddle latch door open mechanism. The door shall be installed utilizing stainless steel nuts and bolts, other fastening device such as self-tapping screws or pop rivets shall not be acceptable.

One (1)  
Tubes (3) - Pike Pole Storage

62-B2-1420

**STORAGE TUBES, PIKE POLE**

Three-(3) aluminum tubes shall be installed on the apparatus for pike pole storage. One-(1) end shall be notched to allow the poles to be locked in place.

One (1)  
62-D2-0220

Trays (2) - Suction Hose, Each Side Above Compartments

**TRAYS, SUCTION HOSE**

Two-(2) aluminum suction hose storage trays shall be installed, one-(1) each side above the body compartments. Each tray shall hold one-(1) 10' section of the specified suction hose and have spring latches to hold hose in position.

One (1)  
64-B2-0420

Compartment - Wheel Well Double Air Bottle, Left Front (SIG4)

**WHEEL WELL AIR BOTTLE COMPARTMENT, LEFT FRONT**

There shall be an air bottle compartment located in the left front body wheel well to house two-(2) spare SCBA cylinders. The compartment shall be constructed of high-density polyethylene to provide scuff protection. The compartment shall be vented to facilitate moisture drainage. The compartment door shall be brushed stainless steel with a push button trigger latch.

One (1)  
64-B4-0420

Compartment - Wheel Well Double Air Bottle, Left Rear (SIG4)

**WHEEL WELL AIR BOTTLE COMPARTMENT, LEFT REAR**

There shall be an air bottle compartment located in the left rear body wheel well to house two-(2) spare SCBA cylinders. The compartment shall be constructed of high-density polyethylene to provide scuff protection. The compartment shall be vented to facilitate moisture drainage. The compartment door shall be brushed stainless steel with a push button trigger latch.

One (1)  
64-B4-6220

Compartment - Wheel Well Double Air Bottle, Right Front (SIG4)

**WHEEL WELL AIR BOTTLE COMPARTMENT, RIGHT FRONT**

There shall be an air bottle compartment located in the right front body wheel well to house two-(2) spare SCBA cylinders. The compartment shall be constructed of high-density polyethylene to provide scuff protection. The compartment shall be vented to facilitate moisture drainage. The compartment door shall be brushed stainless steel with a push button trigger latch.

One (1)  
64-B6-6220

Compartment - Wheel Well Double Air Bottle, Right Rear (SIG4)

**WHEEL WELL AIR BOTTLE COMPARTMENT, RIGHT REAR**

There shall be an air bottle compartment located in the right rear body wheel well to house two-(2) spare SCBA cylinders. The compartment shall be constructed of high-density polyethylene to provide scuff protection. The compartment shall be vented to facilitate moisture drainage. The compartment door shall be brushed stainless steel with a push button trigger latch.

One (1) Body Trim Package  
66-A2-0220

**BODY TRIM**

The standard body trim shall include the following:

There shall be drip rail installed over the compartment door openings.

A drip rail shall be located over each compartment door. This drip rail shall form a lip over the exterior door pans to prevent water from running into a compartment.

The vertical rear face of the body shall be covered with smooth aluminum plate.

One (1) Body Trim - Vertical Handrails (2), Knurled Aluminum  
66-A2-0620

Two-(2) handrails shall be located on the rear of the apparatus, one-(1) handrail per side. Each handrail shall be constructed of 1-1/4" knurled aluminum. The handrails shall be mounted with chrome plated end stanchions. Each handrail shall be sufficient in length to meet all standard requirements.

One (1) Body Trim - NO Rear Stanchions  
66-A2-1420

No rear stanchions shall be provided on this unit.

One (1) Fuel Fill - Recessed w/Door, Left Side  
66-A2-2420

**FUEL FILL, RECESSED WITH DOOR**

There shall be a recessed fuel fill assembly with a non-locking door mounted on the left side of the apparatus body. The fuel fill assembly shall be equipped with a fuel fill cap, retention ring and hinged door. The assembly shall be properly labeled "DIESEL FUEL ONLY".

One (1) Mud Flaps - Rear  
66-A2-4420

**MUD FLAPS, REAR**

The rear axle mud flaps shall be constructed from hard black rubber and installed at the rear of the body fenders.

One (1) Rub Rail - Extruded Aluminum  
66-A2-4620

**RUBRAIL**

There shall be an aluminum rub rail installed on both sides of the lower body compartments. The rub rail shall be constructed from "C" channel extrusion. The aluminum rub rail shall be bolted in place with stainless steel bolts, and spaced from the fire body to provide body protection. The solid rub rail shall serve as protection to the side doors when encountering close objects. Tread plate rub rails or welded on shall not be acceptable.

One (1) Step - 12" Rear, Aluminum Tread Plate  
66-A4-1020

**REAR STEP**

The 12" rear step shall be constructed of 3/16" (.1875") aluminum tread plate. The rear step shall be flanged down 2.50" and in 1.00" to maximize strength and rigidity. The rear step shall be bolted on for removal or replacement.

Four (4)  
66-A4-4420  
All running board and step surfaces shall comply with NFPA 1901.  
Step - Chrome Folding, Front of Body

**CHROME FOLDING STEP(S), FRONT OF BODY**

There shall be four (4) large chrome-folding step(s) with a minimum surface area of thirty-five (35) square inches. The step(s) shall be mounted on the front face of the forward compartment as directed by the customer.

Four (4)  
66-A4-6220  
There shall be an LED light installed above and below each step.  
Step - Chrome Folding, Rear of Body

**CHROME FOLDING STEP(S), REAR OF BODY**

There shall be four (4) rear chrome folding step(s) installed on the rear of the body. Each step shall have a minimum of thirty-five (35) square inches of surface area.

One (1)  
66-A4-8820  
There shall be an LED light installed above and below each step.  
Tow Eyes (2) - Rear, Below Body

**TOW EYES, REAR**

Two-(2) 1" thick rear tow eyes constructed of A-36 steel shall be mounted below the frame at the rear of the vehicle. The tow eyes shall be attached to steel weldments that are mounted to the apparatus. The eyes shall have a minimum dimension of three-(3) inches. The tow eyes shall be used for towing, not lifting the vehicle.

One (1)  
66-A6-2220  
Handrail - Below Hose Bed, Knurled Aluminum

**HANDRAIL, BELOW HOSE BED**

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

Two (2)  
66-A6-6420  
Handrail - Front of Body, 12" Knurled Aluminum

**HANDRAIL(S), FRONT OF BODY**

There shall be two (2) 1-1/4" knurled aluminum handrails installed on the front face of the compartments. They shall be approximately 12" in length. The handrail(s) shall have chrome plated end stanchions.

One (1) Divider - Hose Bed, Pumper  
66-A8-1620

**HOSE BED DIVIDER(S)**

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

One (1) Cover - Hose Bed, Hypalon  
66-A8-4220

**HOSE BED COVER**

A hose bed cover constructed of 16 oz. heavy-duty Hypalon shall be provided. Cover shall be fire retardant and installed over hose bed. The cover shall have chrome twist-locks and Velcro installed around the perimeter of the hose bed. The end of the hose bed cover shall be secured and cover the hose bed opening. The cover shall completely protect the hose in the hose bed and prevent hose from inadvertently deploying during normal operation.

A safety sign FAMA22, which warns of the need to secure hose, shall be visible to personnel at the hose storage area.

One (1) End Flap - Hypalon w/Snaps, Hose Bed  
66-A8-6420

The Hypalon end flap shall be secured at the bottom using pushpins. The cover prevents hose from inadvertently deploying during normal operations meeting the current NFPA requirements.

The cover shall meet the NFPA 1901 15.10.5 requirement.

One (1) Cover/End Flap Color: Red  
66-A8-8020

The cover and/or end flaps shall be red in color.

One (1) Hose Bed Capacity  
66-A8-8820

**HOSE BED CAPACITY**

The hose bed shall have the capacity to hold the following:

No hose bed capacity was specified at the time of proposal completion. The overall height may increase due to the required hose load specified by the Fire Department.

A safety sign FAMA22, which warns of the need to secure hose, shall be visible to personnel at the hose storage area.

One (1) == Body Components - Pumpers - 421.001 04/02/21 ==

One (1) == Elec. Components - Pumper Custom - 421.001 04/02/21 ==

One (1) Electrical System - Apparatus Body, E2020  
70-A2-2020

**ELECTRICAL SYSTEM, BODY**

The body electrical system shall be designed as an integrated electrical package specifically engineered for fire apparatus application. The integrated electrical system shall interface the body and chassis through an engineered system.

All body electrical equipment installed shall conform to current automotive electrical system standard, the latest Federal DOT standards, and the requirements of the applicable NFPA Apparatus Standard. Twisted pair shielded wire shall be provided within the electrical system for noise reduction.

The wiring harness shall conform to SAE J-1128 with GXL temperature properties. All exposed wiring shall be run in loom with a minimum 289 °F rating. All wiring looms shall be properly supported and attached to body members along the entire run. All wiring shall be mounted as to provide protection from water and heat. All connections shall be crimp type with heat shrink tubing with insulated shanks to resist moisture and foreign debris such as grease and road grime. Weather resistant connectors shall be provided throughout to ensure the integrity of the electrical system. Gold contacts shall be used where required for superior connectivity and improved performance. All wiring looms shall be properly supported and attached along the entire run. At any point where wire or looms must pass through metal, rubber grommets shall be installed to protect the wire from abrasion.

Wiring shall be individually and permanently numbered, function and color-coded using an indexing numbering system in which all circuits are categorized by function and shall be permanently marked every three (3) inches on the insulation to allow for easy identification.

All internal wire end terminals, including locking bulkhead connectors, shall be mechanically affixed to the wire ends by machine terminal crimping presses. No hand-crimped terminals shall be acceptable.

All internal splices shall be ultrasonically welded connections - no butt style connections shall be acceptable. All internal wiring shall be of the high temperature GXL type wire and shall be protected by wiring duct wherever possible.

The body shall have an in-vehicle networking system, to provide real time or current state diagnostic capability and reduce troubleshooting or down time.

An electrical harness quick disconnect shall be provided to facilitate removal of the body in the future. All circuit protection shall be integral of control modules. There shall not be automatic reset circuit breakers located in the body main harnessing and distribution system.

The system shall have the capability of delivering multiple signals via a data bus, utilizing specifications set forth by SAE J1939.

The body includes strategically located solid-state modules within the body. The modules are for the body lighting and controls.



The system shall consist of all solid-state components contained inside sealed aluminum extrusions and/or weatherproof Deutsch enclosures referred to as nodes. The system shall also incorporate, as needed, miniature nodes. The nodes shall not have special mounting requirements.

The system, at a minimum, shall be capable of performing the following functions:

- Load management and sequencing
- Switch loads
- Receive digital and analog signals
- Perform and report diagnostics
- Continuously report vehicle status
- System is expandable
- Power distribution outputs
- Switch input capability
- Solid state circuitry
- Self-contained LED diagnostic indicators
- PWR for input power status (red)
- COM for communication status (green)
- The complete body electrical system shall be 100% documented and contain independent circuit diagrams with point to point wiring information, as shall as a general component diagram be included in the apparatus manua

One (1)  
70-A2-4020

Electrical System - 12 Volt Testing

### **12-VOLT TESTING**

The apparatus low voltage system shall be tested and certified. A copy of certification shall be provided to the purchaser with the apparatus.

#### Reserve Capacity Test

The unit shall be run until all engines, engine compartment temperatures are stabilized and the battery system is fully charged. The engine shall be shut off and the minimum continuous electrical load be activated for ten-(10) minutes. All electrical loads shall be shutoff after ten-(10) minutes and the battery system shall then be capable of restarting the engine.

#### Alternator Performance Test at Idle

Minimum continuous electrical loads shall be activated while the unit is at idle speed.

#### Alternator Performance Test at Full Load

The total continuous electrical load shall be activated with the engine running up to the manufacturer's governed speed. The test duration shall be a minimum of two-(2) hours. Activation of the load management system shall be permitted during the test. If however, an alarm is sounded by excessive battery discharge as detected by the system or a system voltage of less than 11.8 volts DC for a 12-volt nominal system for more than 120 seconds, shall be considered a test failure.

#### Low Voltage Alarm Test

The engine shall be shut off and the total continuous electrical load shall be activated and continue to be applied until the excessive battery discharge alarm activates. The test shall be considered a failure if the alarm has not sounded within 140 seconds after the voltage drops to 11.8 volts.

One (1)  
70-A2-6020 12-Volt Wiring Protection - Split Loom

**WIRING PROTECTION**

All 12-volt wiring shall be run in high temperature, rated at a minimum of 275° F, split loom for easy access to wires when trouble shooting.

One (1)  
70-A2-8020 EMI/RFI Protection

**EMI/RFI PROTECTION**

The apparatus shall be manufactured to incorporate the latest designs in the electrical system with components that are state of the art to insure electromagnetic interference (EMI) and radio frequency interference (RFI) emissions are suppressed at the source.

The apparatus shall have the ability to operate in typical fire and rescue situations with no adverse effects from EMI and/or RFI.

The apparatus shall utilize components that are fully protected and wiring that utilizes shielding and loop backgrounds where required to control EMI/RFI susceptibility. The apparatus shall be bonded through ground straps. Relays and solenoids that are suspect to generating spurious electromagnetic radiation are diode and/or resistor protected to prevent transient voltage spikes.

In order to prevent the radio frequency interference completely the purchaser shall be requested to provide a listing of the type, power output, and frequencies of all radio and bio medical equipment that is proposed to be used on the apparatus.

Fourteen (14)  
70-E2-2220 Light - LED Compartment, Amdor Luma Bar AY-9280-\*\*

**LIGHT(S), LED COMPARTMENT**

One (1)  
70-E2-2220 Light - LED Compartment, On Scene Solutions Access Series

**LIGHT(S), LED COMPARTMENT**

One (1) On Scene Solutions Access Series LED surface mount light(s) shall be provided as specified by the customer. Each light produces 400 lumens if light per 18" length. Each Access Series shall be capable of operating at a voltage of 9VDC to 14VDC. Each Access Series shall be cuttable in 2" increments and feature a high quality, impact resistant Lexan™ enclosure.

The light stick shall be waterproof and rated at 100,000 hours of service. Each light stick shall be provided with a 5 year free replacement warranty.

One (1)  
70-E8-8220 Guard - Compartment Light, Stainless Steel

**GUARD(S), COMPARTMENT LIGHT**

There shall be one (1) guards provided to protect the specified compartment light(s). The guards shall be fabricated from stainless steel.

One (1)  
70-H2-0220 Switch - Compartment Door Ajar Indicator

**DOOR AJAR SWITCHES**

All apparatus body doors shall be provided with an auto door switch. These switches shall operate the compartment interior lights and activate the door ajar indicator on each side of apparatus body when the door is opened. There shall be a red door ajar light mounted in the cab, in view of the driver to indicate an unsecured door. There shall be a buzzer mounted in the cab that shall alert the driver.

One (1)  
72-R8-4020 Zone C Upper Lights (2) - Red LED Beacons, Whelen B6LED B6MMRRP

**LIGHTS, ZONE C UPPER**

Two-(2) Whelen model B6MMRRP LED lights shall be installed, one-(1) each side on the upper rear outer corners of the apparatus. The combination tailboard light shall incorporate a L31 series beacon and a 700 series warning light in a polished aluminum housing. The high profile beacon shall incorporate 32 red Super-LEDs, a red optic hard coated polycarbonate lens, and a metalized reflector with clear optic collimators. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The four conformal coated PC boards shall provide additional protection against environmental elements. The high profile beacon shall include 28 Scan-Lock™ patterns including four simulated rotating patterns and synchronized features.

The lower level warning light shall incorporate eight red Super-LEDs, a red optic hard coated polycarbonate lens, and utilize a metalized reflector with integrated TIR hybrid optics for maximum output. The hard coated lens 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 light shall have 14 Scan-Lock flash patterns including steady burn and hi/low power.

The L31 dome lens shall be sealed to a die cast aluminum base with an “O” ring gasket assembly. The 700 series warning light lens 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. An installation kit including mounting hardware shall be provided for surface mounting. The B6MMRRP will contain a 12” non-terminated pigtail. The tailboard light will meet NFPA zone C upper requirements when used as a pair and is covered by a five year factory warranty.

One (1)  
74-D8-2620 Zone B & D Lower Midship (2) - Red w/Clear Lens TIR6 LED, Whelen 50R03ZCR

**LIGHTS, ZONE B/D MIDSHIP LOWER**

Two-(2) Whelen TIR6 Series Super-LED model 50R03ZCR lights shall be installed, one-(1) each side midship of the apparatus. The warning lights shall incorporate red Linear Super-LEDs, a clear optic hard coated polycarbonate lens. The surface mount module includes a chrome flange and hardware for horizontal mounting.

One (1)  
74-G8-1020 Zone B & D Lower Rear (2) - Red w/Clear Lens LINZ6 LED, Whelen LINZ6R

**LIGHTS, ZONE B/D REAR LOWER**

Two-(2) Whelen LINZ6 Series Super-LED model LINZ6R lights shall be installed, one-(1) each side rearward portion of the apparatus. The warning light shall incorporate six red Super-LEDs, a clear non-optic hard coated polycarbonate lens, clear optic collimator and utilize a metalized reflector for maximum output. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The encapsulated lens/reflector assembly and conformal coated PC board shall provide additional protection against environmental elements. The solid state warning lights shall be vibration resistant. The self-contained flashing light shall have 69 Scan-Lock flash patterns including synchronize feature and steady burn. The warning light is covered by a five year factory warranty. The surface mount module includes a black flange and hardware for horizontal mounting.

One (1)  
74-H8-1220 Zone C Lower Lights (2) - Red w/Clear Lens 600 LED, Whelen 60R02FCR

**LIGHTS, ZONE C LOWER**

Two-(2) Whelen 600 Series Super-LED model 60R02FCR shall be installed, one-(1) each side on the lower rear of the apparatus. The warning light shall incorporate red Linear Super-LEDs, a clear optic hard coated polycarbonate lens, and utilize a metalized reflector with integrated TIR hybrid optics for maximum output. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The encapsulated lens/reflector assembly and conformal coated PC board shall provide additional protection against environmental elements. The solid state warning lights shall be vibration resistant. The self-contained flashing light shall have 14 Scan-Lock flash patterns including synchronize feature and steady burn. The warning light is covered by a five year factory warranty.

One (1)  
74-J4-0820 Stop/Turn/Reverse Lights - LED, Whelen 600

**STOP, TURN AND BACK-UP LIGHTS**

Stop, turn and backup lights shall be Whelen 600 Series, individual fixtures. The red stop (LED) light shall be model 60R00BRR, the turn light shall be a model 60A00TAR amber (LED) type with directional arrow, and the backup light shall be a white (LED) model 60C00WCR.

One (1)  
74-J4-2220 Housing - Rear Tail Light Assembly, CAST4

**HOUSING, REAR TAIL LIGHT ASSEMBLY**

The fixtures shall be mounted on each rear face of the body in a model CAST4, four-(4) light head cast aluminum housing.

One (1)  
74-L0-1020 Light - LED Hose Bed, On Scene Access

**LIGHT, SWIVEL MOUNT HOSEBED**

One (1)  
74-L0-2220 Lights - LED Clearance and Maker

**CLEARANCE LIGHTS AND REFLECTORS**

Clearance lights and reflectors shall be LED lights, which include two-(2) red marker lights, four-(4) red rectangular reflectors, two-(2) amber rectangular reflectors and one-(1) red three light cluster recessed in the rear step.

Five (5)  
74-L2-0820 Light - 20" LED Underbody, Luma Bar H20 AY-9500-020

**LIGHT(S), UNDERBODY**

Five (5) Luma Bar H20 20" LED underbody "Ground Effect" light(s) shall be installed at a location to be determined by the Fire Department. The underbody light(s) shall illuminate the ground beneath the apparatus.

The lights shall be controlled by a switch in the cab.

One (1)  
74-L2-1020 Light - 40" LED Underbody, Luma Bar H20 AY-9500-040

**LIGHT(S), UNDERBODY**

One (1) Luma Bar H20 40" LED underbody "Ground Effect" light(s) shall be installed at a location to be determined by the Fire Department. The underbody light(s) shall illuminate the ground beneath the apparatus.

The lights shall be controlled by a switch in the cab.

One (1)  
74-L2-4020 Light - LED License, Whelen OAOEDCR

**LIGHT, LICENSE PLATE**

A Whelen OS Series LED model OACOEDCR shall be provided at the rear of the apparatus to illuminate the license plate. The steady burn illumination light shall incorporate three clear LED and a clear non-optic hard coated polycarbonate lens. The hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The encapsulated assembly shall provide protection against environmental elements. The solid state illumination light shall be vibration resistant. An installation kit including mounting hardware, neoprene gasket and 45 degree angle chrome housing shall be provided for surface mounting. The light will contain a 12" non-terminated pigtail. The illumination light meets SAE J592 requirements and is covered by a five year factory warranty.

Four (4)  
74-L2-4420 Light - LED Perimeter Illumination, Whelen 3SC0CDRC

**LIGHT(S), LED PERIMETER ILLUMINATION**

Four (4) Whelen 3" Round Super-LED® model 3SC0CDRC perimeter illumination light(s) shall be provided as specified. The steady burn illumination light shall incorporate six clear Super-LED and a clear non-optic hard coated polycarbonate lens for maximum output. The hard coated sealed lens shall provide extended life/luster protection against UV and chemical stresses. The light shall be wet sealed and vacuum tested to ensure proper sealing. The conformal coated PC board, powder coated die cast housing, and exterior rubber gasket shall provide additional protection against environmental elements. The 3SC0CDRC shall provide 360 usable lumens. The solid state illumination light shall be vibration resistant. The 3SC0CDRC will contain a 6" unterminated pigtail. The illumination light is covered by a

five year factory warranty. The 3SC0CDCR requires a 3/4" wire entry hole in the body of the vehicle and includes mounting screws and grommet.

One (1)  
74-P2-1020 Lights (2) - 600 LED Scene, Whelen 6SC0ENZR

**LIGHTS, 12-VOLT SURFACE MOUNT SCENE**

One (1) pair of Whelen 600 Series Model 6SC0ENZR 12 diode, 8-32 degree scene lights shall be provided and installed on the apparatus. The lights shall have a linear designed Super LED light head with a four screw mounting assembly and chrome plated trim ring flange.

The scene lights shall be controlled by switch located in the cab.  
Upper Rear Scene Light Activation - Reverse Circuit

One (1)  
74-P4-6420

**ADDITIONAL SCENE LIGHT WIRING, UPPER REAR MOUNTED**

The upper rear body mounted scene lights shall also be wired to come on when the transmission is placed into reverse.

One (1) == Paint - SM Extruded - 421.001 04/02/21 ==

One (1)  
80-C2-0230 Paint - Body

**PAINT FINISH, BODY**

The apparatus body shall be painted with AkzoNobel Sikkens brand paint. The paint process shall meet or exceed current state regulations concerning paint operations. Pollution control shall include measures to protect the atmosphere, water, and soil. Contractor shall, upon demand, provide evidence that the manufacturing facility is in compliance with State EPA rules and regulations.

The body exterior shall have no mounted components prior to painting to assure full coverage of metal treatments and paint to the exterior surfaces of the body. Any vertically or horizontally hinged smooth-plate compartment doors shall be painted separately to assure proper paint coverage on body, door jambs and door edges.

Paint process shall feature AkzoNobel Sikkens high solid BTLV products and be performed in the following steps:

Corrosion Protection - all aluminum surfaces shall be treated with the AkzoNobel Sikkens LV 260 Epoxy coating to provide superior corrosion resistance and excellent adhesion of the base coat.

AkzoNobel Sikkens Sealer/Primer BTLV - acrylic urethane sealer/primer shall be applied to guarantee excellent gloss hold-out, chip resistance and a uniform base color.

AkzoNobel Sikkens High Solid BTLV650 (Base coat) - a lead-free, chromate-free high solid polyurethane base coat shall be applied, providing excellent coverage and durability. A minimum of two-(2) coats shall be applied.

AkzoNobel Sikkens High Solid BTLV650 (Clear coat) - high solid LV clear coat shall be applied as the final step in order to ensure full gloss and color retention and durability. A minimum of two-(2) coats shall be applied.

Any location where aluminum is penetrated after painting, for the purpose of mounting steps, hand rails, doors, lights, or other specified components shall be treated at the point of penetration with a corrosion inhibiting pre-treatment (ECK Corrosion Control). The pre-treatment shall be applied to the aluminum sheet metal or aluminum extrusions in all locations where the aluminum has been penetrated. All hardware used in mounting steps, hand rails, doors, lights, or other specified components shall be individually treated with the corrosion inhibiting pre-treatment.

After the paint process is complete, the gloss rating of the unit shall be tested with a 60 degree gloss meter. Coating thickness shall be measured with a digital MIL gauge and the orange peel with a digital wave scan device.

One (1)  
80-C2-0420 Paint Color/Code: Red FLNA 31979 (FFA Red 1)

**PAINT COLOR/CODE**

The paint color/code shall be red FLNA 31979.  
Interior Compartment Finish - Natural

One (1)  
80-D2-1220

**INTERIOR COMPARTMENT FINISH**

The interior of the body compartments shall be a natural finish.  
NFPA Striping - Dealer Supplied

One (1)  
80-E2-0220

Striping - Rear Body, Reflective Chevron

One (1)  
80-E8-0220

**STRIPE, REAR CHEVERON**

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

One (1)  
80-E8-0620 Chevron Striping Colors: 3M Red & Lime Green

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

One (1)  
80-E8-4020 Reflective Material - Designated Walking Surfaces

**REFLECTIVE MATERIAL, DESIGNATED WALKING SURFACES**

1" wide yellow perimeter marking consisting of individual Reflexite diamonds shall be applied to indicate the outside edge of designated standing and walking areas above 48" from the ground in compliance with 2016 NFPA 1901. Steps, ladders and areas with a railing or structure at least 12" high are excluded from this requirement.

FC94 Pumpers

One (1) Lettering Package - Dealer Supplied  
80-G2-0420

One (1) == Warranty / Manuals - Pumpers Custom - 421.001 04/02/21 ==

One (1) Warranty - Body Material & Workmanship, 2-Year / 36,000 Miles  
98-A2-0420

**WARRANTY, BODY MATERIAL & WORKMANSHIP**

The purchaser shall receive a general two-(2) year or 36,000 miles limited warranty in accordance with, and subject to, warranty certificate RFW0002. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

One (1) Warranty - Body Structure, 10-Year/100,000 Miles  
98-A4-0420

**WARRANTY, BODY STRUCTURAL**

There shall be a ten-(10) year body warranty on each new fire body/heavy-duty rescue apparatus. The bodies are to be free of structural failures caused by defective design or workmanship for a warranty period of ten-(10) years after the date on which the vehicle is first delivered to the original purchaser or 100,000 miles, whichever occurs first.

One (1) Warranty - Body Paint/Perforation, 10 Year  
98-A6-0220

**WARRANTY, BODY PAINT/PERFORATION**

The manufacturer shall warrant each new fire and rescue apparatus body during the warranty period, when used in normal and reasonable manner. All apparatus shall be warranted against peeling, cracking, blistering and corrosion. This warranty shall provide for repair or replacement at the manufacturer's option, any claim in accordance with the following terms and conditions.

**WHAT IS COVERED**

**WARRANTY APPLIES** - This warranty is for all new fire and rescue apparatus manufactured by the bidder and is extended only to the original user-purchaser. The warranty registration must be received by the manufacturer within 30 days of the in-service for the warranty to apply.

**REPAIRS COVERED** - The warranty covers repair or replacement at the manufacturer's option. Repairs shall be made at a factory owned service facility or another approved service facility.

**OBTAINING REPAIRS** - The original user-purchaser must notify the manufacturer in writing within 30 days after any claimed defect has appeared. Transportation costs to and from the servicing center shall be the responsibility of the user-purchaser.

**WARRANTY PERIOD** - The warranty period shall begin upon delivery of the apparatus to the original user-purchaser. The warranty period shall be for **TEN YEARS**. Corrosion perforation is defined as **complete penetration** through the exterior metal of the apparatus. The following percentages apply:

Topcoat & Appearance (Gloss, Color Retention and Cracking):  
0 to 72 months: 100%  
73 to 120 months: 50%



Coating System, Adhesion & Corrosion (Includes Dissimilar Metal Corrosion, Flaking, Blistering and Bubbling)

0 to 36 months: 100%

37 to 84 months: 50%

85 to 120 months: 25%

**NOTES:**

*\*Under carriage, cab and body interiors are covered under our standard two-(2) year warranty.*

*\*Demonstration vehicles sold to an end user will have the full warranty, if sold within two-(2) years of demonstration service, and will be prorated if sold after the second year.*

**WHAT IS NOT COVERED**

\*Any cab not manufactured by the bidder.

\*Damage caused by fire, misuse, negligence or accident.

\*Damage caused by theft, vandalism, riot or explosion.

\*Damage caused by lightning, earthquake, windstorm, hail, flood or use in an acidic environment (such as de-icing compounds, road salts and acid rain).

\*Any repairs, modifications, alterations or aftermarket parts added after manufacture without the authorization of the manufacturer.

\*Damage from lack of, maintenance and cleaning (proper cleaning and maintenance procedures are detailed in the provided maintenance manual).

\*Gold leaf or striping except that which is affected by repair (Gold Leaf or striping must have been installed during manufacturing to be covered under this limited warranty).

\*Loss of time, loss of use of the product, inconvenience, lodging, food or other consequential or incidental loss that may result from a failure.

One (1)  
98-A8-6020

Warranty - Hale Pumps

**WARRANTY, HALE FIRE PUMP**

**EXPRESS WARRANTY**

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

**LIMITATIONS**

HALE’S obligation is expressly conditioned on the Product being:

- Subjected to normal use and service
- Properly installed and maintained in accordance with HALE’S Instruction Manual and Industry Standards as to recommended service and procedures
- Not damaged due to abuse, misuse, negligence, or accidental causes
- Not altered, modified, serviced (non-routine), or repaired other than by an Authorized Service facility

- Manufactured per design and specifications submitted by the original buyer
- Used with an appropriate engine as determined by the engine manufacturers published data
- Excluded are normal wear items identified as but not limited to packing, strainers, anodes, filters, light bulbs, intake screens, wear rings, mechanical seals, etc.

One (1)  
98-A8-8020  
Warranty - Plumbing System, 10-Year

**WARRANTY, PLUMBING SYSTEM**

There shall be a ten-(10) year pump plumbing warranty provided. The warranty covers all plumbing components used in construction of the fire apparatus water/foam plumbing system against defects and workmanship, provided the apparatus is used in a normal and reasonable manner. The warranty is extended only to the original user-purchaser for a period of 10 years from the date of delivery.

One (1)  
98-A8-8420  
Warranty - Poly Water Tank, Lifetime

**WARRANTY, WATER TANK**

The poly tank manufacturer warrants each tank to be free from manufacturing defects in material and workmanship for the service life of the original vehicle (vehicle must be actively used in fire suppression). The warrant is transferable, with written approval of the manufacturer. Each tank is inspected and tested for leaks prior to leaving the manufacturing facility. The tank shall be installed in the vehicle in accordance to the manufacture's guidelines.

There are no warranties, expressed or implied, which extend beyond the description of the face hereof. There is no expressed or implied warranty of merchantability or a warranty of fitness for a particular purpose. Additionally, this warranty is in lieu of all other obligations or liabilities on the part of the Manufacturer.

One (1)  
98-B2-1820  
Manuals - Apparatus Body & Components

**MANUALS, APPARATUS BODY**

The contractor shall supply, at time of delivery, at two-(2) sets of complete operation and service documentation covering the completed apparatus as delivered and accepted.

The documentation shall address at least the inspection, service, and operations of the fire apparatus and all major components thereof.

One (1)  
98-B2-2020  
Manuals - Pump

**MANUALS, FIRE PUMP**

There shall be two-(2) copies of pump manuals provided to the department.

One (1)  
98-B2-2220  
Safety Guide - FAMA

**SAFETY GUIDE**

One-(1) copy of the latest edition of FAMA's Fire Apparatus Safety Guide shall be provided with the completed apparatus.

One (1)  
98-B2-6620  
Wiring Diagrams - Apparatus Body, Standard

**WIRING DIAGRAMS, APPARATUS BODY**

There will be a complete set of generic electrical schematics provided at the time of delivery. These schematics will have each circuit properly numbered and in color.

The schematic will show each connector in the circuitry and the position in which each circuit enters, exits, or terminates. The schematic will be drawn in such a manner as to allow individual circuitry to be followed throughout the apparatus.

These schematics will not have the circuitry condensed into a single line or sets of lines. Multiple sheets will be acceptable so long as each of the harnesses is properly identified to the connecting sheet and harness. There will be a border around the paper(s), which contain alpha and numeric characters for indexing coordinate reference. There will be an indexing or part reference document for quick location of items shown on the schematics.

This document will refer the user to the appropriate drawing and page number and to sections of the drawing(s) by the means of letter and number coordinates. The schematic will show all harnesses used in the apparatus cab, chassis and body that is supplied by the chassis and body manufacturer.

Modifications to the manufactured standard harnesses are to be documented and properly indexed for quick identification.

One (1)  
A complete wire number, color, and function listing will accompany the schematics.  
== Loose Equipment Pkg. - Pumper - 421.001 04/02/21 ==

One (1)  
90-A2-0220  
Equipment Package - NFPA 1901 2016, Fire Department Supplied

**NFPA REQUIRED EQUIPMENT, FD SUPPLIED**

The loose equipment as outlined in NFPA 1901, 2016 edition, section 5.9 thru 5.9.4 shall be provided by the fire department unless it is listed in this proposal. All loose equipment shall be installed on the apparatus before placed in emergency service, unless the Fire Department authorized agent signs the State of Exception as listed in the NFPA 1901 Standard for Automotive Fire Apparatus sections 4.21 thru 4.21.2.

One (1)  
90-C4-0420  
Ladder - 10' Folding Attic, Duo-Safety 585-A

**LADDER(S), 10' FOLDING**

There shall be one (1) Duo-Safety Model 585-A, 10' folding ladder(s) provided with the apparatus. The ladder(s) shall be aluminum, single-section with rubber feet. The ladder(s) shall meet or exceed the latest NFPA standards.

One (1)  
90-C8-0220 Ladder - 12' Roof, Duo-Safety 775-A

**LADDER(S), 12' ROOF**

There shall be one (1) Duo-Safety Model 775-A, 12' roof ladder(s) supplied with the apparatus. The ladder(s) shall be aluminum, single-section with folding steel roof hooks on one end and steel spikes at the other. The ladder(s) shall meet or exceed the latest NFPA standards.

One (1)  
90-D8-1020 Ladder - 24' 2-Section Extension, Duo-Safety 900-A

**LADDER(S), 24' 2-SECTION EXTENSION**

There shall be one (1) Duo-Safety model 900-A, 24' two-section ladder(s) supplied with the apparatus. The extension ladder(s) shall be aluminum with steel spurs on one end. The ladder(s) shall meet or exceed the latest NFPA standards.

One (1)  
90-H8-0420 Hose (2) - PVC Flexible Suction, Kocheck 10' x 6"

**SUCTION HOSE, 6"**

There shall be two-(2) 10' x 6" sections of Kocheck PVC flexible suction hose supplied with the apparatus. Lightweight aluminum couplings shall be provided on the suction hose. A long handle female swivel shall be provided on one end and a rocker lug male shall be provided for the other end.

One (1)  
90-K2-2620 Strainer - 6" Floating, Kocheck FSB60

**STRAINER, 6" FLOATING**

There shall be one-(1) Kocheck FSB60, 6" self leveling floating strainer supplied with the apparatus. The strainer shall have a 6" NH female swivel connection.

One (1)  
90-K4-1220 Bracket - Floating Strainer, Kocheck FSMB

**BRACKET, STRAINER**

There shall be one (1) Kocheck Model FSMB bracket installed on the apparatus to store a floating strainer.

One (1)  
92-C4-2420 Elbow - 3" FNST RL x 4" Storz 30 Degree, Kocheck SKE43R

**30 DEGREE ELBOW(S) - 3" FNST X 4" STORZ**

There shall be one (1) Kocheck model SKE43R, 3" FNST rocker lug x 4" Storz, adapter supplied with the apparatus. The elbow(s) shall have a 30-degree turn down.

One (1)  
92-F4-0620 Cap w/Chain - 4" Storz, Kocheck CC407

**CAP(S), 4" STORZ**

There shall be one (1) Kocheck model CC407, 4" Storz cap(s) with chain provided with the apparatus.

FC94 Pumpers

One (1) Wheel Chocks (2) - Folding, Ziamatic SAC-44-E w/Mounting Bracket  
96-C2-0220

**WHEEL CHOCKS WITH BRACKETS**

There shall be one (1) pair of Ziamatic model SAC-44 folding wheel chocks with SQCH-44-H horizontal chock holder(s) mounted on the apparatus body as directed by the fire department.

Four (4) Bracket - Air Pack, Ziamatic UN-6-30  
96-M6-1020

**BRACKET(S), AIR PACK**

There shall be four (4) Ziamatic Model UN-6-30 air pack bracket(s) installed on the apparatus as specified by the Fire Department.

One (1) == Administration - 421.001 04/02/21 ==