

## **Class A Rescue Pumper Specification for the Belmont NH. Fire Department**

It is the intent of these specifications to clearly describe the furnishing and delivery to the Belmont Fire Department, a complete apparatus equipped as specified. The primary objective of these specifications is to obtain the most acceptable apparatus for service in the Fire Department. These specifications cover specific requirements as to the type of construction and tests the apparatus must conform, together with certain details as to finish, material preferences, equipment and appliances with which the successful proposal must conform.

The design of the apparatus must embody the latest approved automotive design practices. The workmanship must be of the highest quality in its respective field. Special consideration shall be given to service access to areas needing periodic maintenance, ease of operation, and symmetrical proportions. Construction must be heavy-duty and ample safety factors must be provided to carry loads as specified. The construction method employed will be in such a manner as to allow ready removal of any component for service or repair.

The apparatus shall conform to the National Fire Protection Association Standard for Automotive Fire Apparatus, number 1901, in its most recent edition, unless otherwise specified in this document. Only the specified firefighting support equipment listed in these specifications shall be provided.

The apparatus shall further conform to all Federal Motor Vehicle Safety Standards. No exception.

Each proposal shall furnish satisfactory evidence of their ability to design, engineer, and construct the apparatus specified and shall state the location of the factory producing the apparatus. They shall also substantiate they are in a position to render prompt and proper service and to furnish replacement parts for the apparatus.

Each proposal must be accompanied by a set of detailed contractor's specifications consisting of a detailed description of the apparatus and equipment proposed. All proposal specifications must be in the same sequence as the advertised specification for ease of comparison. These specifications shall include size, location, type, and model of all component parts being furnished. Detailed information shall be provided on the materials used to construct all facets of the apparatus body. Any company who submits a proposal who fails to submit detailed construction specifications, or who photo copies and submits these specifications as their own construction details will be considered non-responsive and shall render their proposal ineligible for award. No exception.

It shall be the responsibility of the company that submits a proposal to assure that their proposal arrives at the location and time indicated. **Late proposals, telegrams, facsimile, or telephone proposals will not be considered.** No exception.

All RFP's are required to detail the payment terms for apparatus on the proposal page. Any required prepayments or progress payments must be explained in detail.

## **ISO Compliance**

The manufacturer shall operate a Quality Management System meeting the requirements of ISO 9001:2000.

The International Organization for Standardization (ISO) is a recognized world leader in establishing and maintaining stringent manufacturing standards and values. The manufacturer's certificate of compliance affirms that these principles form the basis for a quality system that unswervingly controls design, manufacture, installation, and service.

The manufacturer's quality systems shall consist of, but not be limited to, all written quality procedures (aka QOP) and other procedures referenced within the pages of the manufacturer's Quality Manual, as well as all Work Instructions, Workmanship Standards, and Calibration Administration that directly or indirectly impacts products or processes. In addition, all apparatus assembly processes shall be documented for traceability and reference. The manufacturer shall also engage the services of a certified third party for testing purposes where required.

If the manufacturer operates more than one manufacturing facility each facility must be ISO certified.

By virtue of its ISO compliance the manufacturer shall provide an apparatus that is built to exacting standards, meets the customer's expectations, and satisfies the customer's requirements.

A copy of the manufacturer's certificate of ISO compliance for each manufacturing facility shall be provided with the bid.

## **Reference List**

Each proposal shall be accompanied by a list of at least twenty-five (25) similarly constructed apparatus presently in service. Each reference must be apparatus built of the same construction style as these specifications call for. This list shall include customers' names, addresses, date apparatus was placed in service and a current contact with phone number.

## **Single Source Manufacturing - Pumper**

In order to protect the Belmont Fire Department from divided warranty responsibility between chassis and body manufacturers, proposals will only be accepted from apparatus builders who design, fabricate, and assemble the complete apparatus at their own facilities. This shall include the cab shell, chassis assembly, and complete body structure. Private labeling of another manufacturer's chassis will not meet the requirements of this section. No exception.

# **TESTING COMPLIANCE STANDARD**

## **NFPA Compliance**

The supplied components of the apparatus shall be compliant with NFPA 1901, current edition.

## **BUMPERS**

### **1. Front Bumper**

The vehicle shall be equipped with a one-piece 10" high bumper made from 10 gauge (or thicker) gauge polished stainless steel for corrosion resistance, strength, and long lasting appearance. It shall be mounted directly to the front frame extensions for maximum strength.

### **2. Front Bumper Extension**

The bumper shall be extended approximately 20" from the face of the cab as required.

### **3. Bumper Gravel Shield**

The extended front bumper gravel shield shall be made of aluminum tread plate material or comparable material.

## **BUMPER TRAYS**

### **4. Bumper Tray - Center**

A hose tray constructed of aluminum shall be recessed into the front bumper extension. The tray shall be located in the center of the bumper and be approximately 10" deep (9" to the top of the slats). One inch thick aluminum slats shall be included in the bottom of the hose tray to aid in the dissipation of water from the tray. Supply a way of draining water build up from the tray. The center tray shall hold at least 150 feet of 1 ¾ hose with a nozzle.

### **5. Lid, Bumper Hose Tray**

The center bumper tray shall have a diamond plate lid. The lid shall be hinged and shall be secured in the closed position by a D-Ring latch and held open with a pneumatic shock. The tray shall have a lip around it to prevent water from entering the tray. The cover shall have a seal on it to assist in preventing water from entering the tray.

## **FRAME ASSEMBLY**

### **6. Frame Rail Construction**

The frame shall consist C-channel frame rails with heavy-duty cross-members. Each frame rail shall have the minimum specifications in order to minimize frame deflection under load and thereby improve vehicle ride and extend the life of the frame:

Resistance to Bending Moment must supply information on the specifications of the RMB.

If larger rails are provided, the maximum height of each frame rail shall not exceed the 10- 3/4” in order to ensure the lowest possible body height for ease of access as well as the lowest possible vehicle center of gravity for maximum stability.

There shall be a minimum of six (6) cross-members joining the two (2) frame rails in order to make the frame rigid and hold the rails/liners in alignment. The cross-members shall be attached to the frame rails with not less than four (4) bolts at each end arranged in a bolt pattern to adequately distribute the cross-member load into the rail/liner and minimize stress concentrations.

All frame fasteners shall be high-strength Grade 8, for frame strength, durability, and ease of repair. The nuts shall be locknuts style to help prevent loosening. The frame fasteners shall be tightened to the proper torque at the time of assembly.

The frame rails and frame liners shall be finished with black paint. The frame cross-members and frame mounted components (suspensions, axles, air tanks, battery boxes, fuel tank, etc.) shall be painted black.

The apparatus manufacturer shall supply a full lifetime frame warranty including cross-members against defects in materials or workmanship. Warranties that provide a lifetime warranty for only the frame rails, but not the cross-members, are not acceptable. **NO EXCEPTIONS.**

The custom chassis frame shall have a **WHEEL ALIGNMENT** in order to achieve maximum vehicle road performance and to promote long tire life. The alignment shall conform to the manufacturer’s internal specifications. All wheel lug nuts and axle U-bolt retainer nuts shall be tightened to the proper torque at the time of alignment. The wheel alignment documentation shall be made available at delivery upon request.

The frame shall be undercoated or painted to prevent rust and corrosion.

## **7. Frame Liner**

A frame liner shall be bolted to each frame rail for added strength and rigidity. For each frame rail liner used a complete list of specifications must be supplied.

The frame liners shall be inserted inside the open portion of the frame rails and shall run continuously from the rear of the frame to the centerline of the front axle to provide maximum frame strength at all critical load points.

## **8. Rear Underbody Support Frame**

The body shall be supported at the rear by a steel frame extension bolted to the chassis frame rails. The frame rails and frame extension shall be isolated from the body.

Any frame extension assembly will be welded to steel weldments, which are secured to the chassis frame with grade 8- 5/8" bolts or equivalent.

The frame extension shall not interfere with N.F.P.A. minimum requirements for angle of departure.

## **AXLE OPTIONS**

### **9. Front Axle**

The vehicle shall utilize a front axle with a rated capacity of 18,000 lbs or more. It shall have knuckle pin bushings and 68.5" kingpin centers. The axle shall be of I-beam construction and utilize grease-lubricated wheel bearings. The vehicle shall have a nominal cramp angle of 45 degrees, plus two (+ 2) degrees to minus three (- 3) degrees including front suction applications.

The front axle hubs shall be made from ductile iron and shall be designed for use with 10 hole hub-piloted wheels in order to improve wheel centering and extend tire life.

The front springs shall be parabolic tapered, minimum 4" wide x 54" long (flat), minimum three (3) leaf, progressive rate with bronze bushings and a capacity of 18,000 lbs or higher. at the ground.

Supporting documentation/data shall be provided.

The vehicle shall be equipped with a integral power steering gear used in conjunction with a slave gear or a power assist cylinder depending on application. The steering assembly shall be rated to statically steer a maximum front axle load of 18,000 lbs. Relief stops shall be provided to reduce system pressure upon full wheel cut. The system shall operate mechanically should the hydraulic system fail.

A minimum 2-year/unlimited miles parts and 2-year labor axle warranty shall be provided.

The alignment shall conform to the manufacturer's internal specifications. All wheel lug nuts and axle U-bolt retainer nuts shall be tightened to the proper torque at the time of alignment. The wheel alignment documentation shall be made available at delivery.

### **10. Front Shock Absorbers**

The front suspension shall be furnished with two (2) heavy-duty, double acting shock absorbers, and one (1) on each side.

## **11.Rear Axle**

The vehicle shall be equipped with a single rear axle with single-reduction hypoid gearing and a manufacturer's rated capacity of 27,000 lbs or more. The axle shall be equipped with oil-lubricated wheel bearings with oil type seals.

The rear axle hubs shall be made from ductile iron and shall be designed for use with 10 hole hub-piloted wheels to improve wheel centering and extend tire life.

A minimum 2-year/unlimited miles parts and 2-year labor rear axle warranty shall be provided.

## **12. Automatic Traction Control**

To further improve vehicle drive characteristics, the unit shall be fitted with automatic traction control (ATC). This system shall control drive wheel slip during acceleration from a resting point. An extra solenoid valve shall be added to the ABS system. The system shall control the engine and brakes to improve acceleration slip resistance. The system shall have a dash mounted light that shall come on when ATC is controlling drive wheel slip.

A minimum 3 year/unlimited miles parts and labor Automatic Traction Control (ATC) warranty shall be provided.

# **SUSPENSIONS**

## **13.Rear Suspension**

The rear suspension shall be a pair of linear-rate leaf springs with auxiliary" helper" leaf springs and bronze bushings. The variable-rate springs with auxiliary springs ensure that the vehicle rides and handles smoothly under both loaded and unloaded conditions. The suspension shall be rated for the maximum axle capacity.

# **WHEEL OPTIONS**

## **14.Front Wheel Trim Package**

The front wheels shall have stainless steel lug nut covers (chrome plated steel lug nut covers not acceptable). The front axle shall be covered with American made Real Wheels brand mirror finish, 304L grade, or comparable wheel trim package. Non-corrosive stainless steel universal baby moons. All stainless steel baby moons shall carry a lifetime warranty plus a 2 year re-buffing policy. There shall be two (2) baby moons and twenty (20) lug nut covers.

## **15.Rear Wheel Trim Package, Single Axle**

The rear wheels shall have stainless steel lug nut covers (chrome plated steel lug nut covers not acceptable). The rear axle shall be covered with American made Real Wheels brand mirror finish, 304L grade, non-corrosive stainless steel, spring clip band mount high hats, DOT user

friendly. All stainless steel high hats shall carry a lifetime warranty plus a 2 year re-buffing policy. There shall be two (2) high hats and twenty (20) lug nut covers.

### **16. Front Wheels**

The vehicle shall have two (2) polished (on outer wheel surfaces only) aluminum disc wheels. They shall be forged from one piece corrosion-resistant aluminum alloy and sized appropriately for the tires.

### **17. Rear Wheels**

The vehicle shall have four (4) polished (on outer wheel surfaces only) aluminum disc wheels. They shall be forged from one-piece corrosion-resistant aluminum alloy and sized appropriately for the tires.

## **TIRE OPTIONS**

### **18. Front Tires**

Front tires shall be two **Michelin** 315/80R22.5 tubeless type 20 PR radial tires with XZA-1 highway tread.

Tires with wheels shall have the following weight capacity and speed rating:

18,000 lbs. @ 75 mph

The tires and wheels shall conform to the Tire and Rim Association requirements.

### **19. Rear Tires**

The rear tires shall be **Michelin** 12R22.5 tubeless type radial tires with XDN2 mud and snow tread.

The tires with wheels shall have the following weight capacity:

27,000 lbs. (dual) @ 75 MPH

The wheels and tires shall conform to the Tire and Rim Association requirements.

### **20. Tire Pressure Monitor**

The apparatus shall be provided with tire pressure indicating valve stem caps. The indicators shall be installed on each tire and be a heavy duty design manufactured specifically for trucks. When tire is properly inflated, the indicator inside the cap shall be green, and when the tire is underinflated by 10%, the indicator inside the cap shall be red.

## **BRAKE SYSTEMS**

### **21. Front Brakes**

The front axle shall be equipped with S-cam brakes with automatic slack adjusters.

A minimum 3-year/unlimited miles parts and 3-year labor front brake warranty shall be provided. Warranty shall include bushings, seals, and cams.

## **22. Rear Brakes**

The rear axle shall be equipped with S-cam brakes with cast brake drums. The brakes shall be furnished with automatic slack adjusters.

A minimum 3 year/unlimited miles parts and 3 year labor rear brake warranty shall be provided. The warranty shall include bushings, seals, and cams.

## **23. Brake System**

The vehicle shall be equipped with air-operated brakes and an anti-lock braking system (ABS). The brake system shall meet or exceed the design and performance requirements of the current Federal Motor Vehicle Safety Standard (FMVSS)-121, and the test requirements of the current NFPA 1901 Standard.

A dual-treadle brake valve shall correctly proportion the braking power between the front and rear systems. The air system shall be provided with a rapid pressure build-up feature, designed to meet current NFPA 1901 requirements, to allow the vehicle to begin its emergency response as quickly as possible.

Two (2) air pressure needle gauges, one (1) each for front and rear air pressure, with a warning light and buzzer shall be installed at the driver's instrument panel.

The braking system shall be provided with a minimum of three (3) air tank reservoirs for a total air system capacity of 5,214 cu. in. One (1) reservoir shall serve as the wet tank and a minimum of one (1) tank shall be supplied for each of the front and rear axles. The total system shall carry a sufficient volume of air to comply with FMVSS-121.

Tank Capacities in Cubic Inches:

Wet	Front	Rear	Total
1,738	1,738	1,738	5,214

A separate tank shall be provided for the air horns, this tank shall not be used for the braking system. (NOTE)

Spring-actuated emergency/parking brakes shall be installed on the rear axle.

A Bendix-Westinghouse SR-1 valve, in conjunction with a double check valve system, shall provide automatic emergency brake application when the air brake system pressure falls below 40 psi in order to safely bring the vehicle to a stop in case of an accidental loss of braking system air pressure.

A four-channel ABS shall be provided to improve vehicle stability and control by reducing wheel lock-up during braking. This braking system shall be fitted to both front and rear axles. All electrical connections shall be environmentally-sealed for protection against water, weather, and vibration.

Each wheel shall be individually controlled. Should a malfunction occur in one circuit, that circuit shall revert to normal braking action. A warning light at the driver's instrument panel shall signal a malfunction.

The system shall also be configured to work in conjunction with all auxiliary engine, exhaust, or driveline brakes to prevent wheel lock-up.

To improve maintenance troubleshooting, provisions in the system for an optional diagnostic tester shall be provided. The system shall test itself each time the vehicle is started, and a dash-mounted light shall go out once the vehicle is moving above 4 MPH.

A minimum 3 year/unlimited mile parts and labor Anti-Locking Braking System (ABS) warranty shall be provided as standard.

#### **24. Park Brake Release**

One (1) Bendix-Westinghouse PP-5 parking brake control valve shall be supplied on the lower dash panel within easy reach of the driver.

## **AIR SYSTEM OPTIONS**

#### **25. Air Dryer**

The chassis air system shall be equipped with a Bendix-Westinghouse AD-9 air dryer to remove moisture from the air in order to help prevent the air lines from freezing in cold weather and prolong the life of the braking system components.

#### **26. Air Inlet**

A brass quick-release air inlet with a male connection. The inlet shall allow a shoreline air hose to be connected to the vehicle, discharging air directly into the wet tank of the air brake system. It shall be located on the driver's side in proximity to the shore line.

#### **27. Air Lines**

Air brake lines shall be constructed of color coded nylon tubing routed in a manner to protect them from damage. Brass fittings shall be provided.

## **28. Air Horns**

Dual air horns shall be provided connected to the chassis air system. The horns shall be mounted through the front bumper. The front bumper shall have two (2) holes punched to accommodate the air horns. A separate air tank specifically for the air horn use shall be installed.

# **ENGINES & TRANSMISSIONS**

## **29. Engine/Transmission Package**

### **Engine**

The vehicle shall utilize a Cummins ISL 2010 electronic engine as described below: OR comparable engine with complete specifications supplied.

- 450 gross bhp at 2200 rpm
- 1250 lb.-ft. peak torque at 1400 rpm
- Six (6)-cylinder, charge air cooled, 4-cycle diesel
- 543 cu. in. displacement -- 4.49 in bore x 5.69 in stroke (8.9 liters)
- 16.6:1 compression ratio
- Interact System Controlled Viable Geometry Turbocharged
- Engine shall be equipped with Full-Authority Electronics
- Electronic Timing Control fuel system
- Fuel cooler (when equipped with a fire pump)
- Fleetguard FS1022 fuel filter with integral water separator and water-in-fuel sensor approved by Cummins for use on the ISL engine
- Fleetguard LF9009 Venturi Combo combination full-flow/by-pass oil filter approved by Cummins for use on the ISL engine
- Engine lubrication system, including filter, shall have a minimum capacity of 25 quarts
- Delco-Remy 39 MT-HD 12-volt starter
- Cummins 18.7 cubic foot per minute (cfm) air compressor
- Corrosion inhibitor additive for coolant system
- After treatment system consisting of a oxidation catalyst and diesel particulate filter and selective catalyist reduction system
- Ember separator compliant with 2009 NFPA 1901 standard
- The engine shall be compliant with 2010 EPA Emission standards

The engine air intake shall draw air through the front cab grill. The air cleaner shall be easily accessed for service. Air cleaner intake piping shall be made from aluminized steel tubing with flexible rubber hoses. Air cleaner to ensure proper sealing under all temperatures in order to keep dust and other contaminants out of the engine intake air stream and protect the engine.

The engine exhaust piping shall be a minimum of 4" diameter welded aluminized steel tubing. The muffler shall be mounted in back of the cab in order to minimize heat transmission to the cab and its occupants. The exhaust shall be directed away from the vehicle on the right side ahead of the rear wheels in order to keep exhaust fumes as far away as possible from the cab and pump operator position.

A minimum 5-year/100,000-miles parts and labor warranty shall be provided as standard by Cummins Bulletin 3381161.

A copy of the Engine Installation Review stating the engine installation meets Cummins recommendations shall be provided as requested. The engine installation shall not require the operation of any type of "power-down" feature to meet engine installation tests.

### **30. Transmission**

The vehicle shall utilize an Allison EVS3000P, electronic, 5-speed automatic transmission. Or comparable and all specifications shall be supplied.

A transmission oil temperature gauge with warning light and buzzer shall be installed on the cab instrument panel to warn the driver of high oil temperatures that may damage the transmission.

The transmission shall have a gross input torque rating of 1250 lb.-ft. and a gross input power rating of 450 HP.

The gear ratios shall be as follows:

1 - 3.49

2 - 1.86

3 - 1.41

4 - 1.00

5 - .75

R - 5.03

The transmission shall be equipped with a fluid level sensor (FLS) system, providing direct feedback of transmission oil level information to the driver.

A water-to-oil transmission oil cooler shall be provided to ensure proper cooling of the transmission when the vehicle is stationary (no air flow). Air-to-oil transmission oil coolers, which require constant air flow, are not acceptable.

The transmission shall be provided with two (2) engine-driven PTO openings located at the 4 o'clock and 8 o'clock positions for flexibility in installing pto-driven equipment, or equivalent.

The automatic transmission shall be equipped with a power lock-up device. The transmission lock-up shall prevent down shifting of the transmission when the engine speed is decreased during pump operations, thereby maintaining a constant gear ratio for safe operation of the pump. The transmission lock-up shall be automatically activated when the pump is engaged in gear. The transmission lock-up shall be automatically deactivated when the pump is disengaged for normal road operation.

The transmission shall have a magnetic drain plug installed in it.

A minimum 5-year/unlimited miles parts and labor warranty shall be provided as standard by Allison Transmission.

### **31. Transmission Selector**

A push-button transmission shift module, Allison model 29538373, shall be located to the right side of the steering column within easy reach of the driver. The shift position indicator shall be indirectly lit for after dark operation. The shift module shall have a "Do Not Shift" light and a "Service" indicator light. The shift module shall have means to enter a diagnostic mode and display diagnostic data including oil life monitor, filter life monitor, transmission health monitor and fluid level. A transmission temperature gauge with warning light and buzzer shall be installed on the cab instrument panel.

### **32. Transmission Fluid**

The transmission fluid shall be TransSynd synthetic.

### **33. Vehicle Speed**

The maximum speed shall be electronically limited to 68 MPH as required by NFPA 1901.

Note: Maximum speed may be set at 65 MPH due to tire rating.

## **SECONDARY BRAKING**

### **34. Jacobs Engine Brake**

One (1) Jacobs engine brake shall be installed to assist in slowing and controlling the vehicle as required by NFPA 1901 for vehicles with gross vehicle weight ratings (GVWR) of 36,000 lbs. or greater. An on-off control switch and a high-medium-low selector switch shall be mounted in the cab.

When activated, the Jacobs engine brake shall cut off the flow of fuel to the cylinders and alter the timing of the exhaust valves. This shall transform the engine into a high-pressure air compressor, driven by the wheels, and the horsepower absorbed by the engine in this mode shall slow the vehicle. The selector switch allows the driver to select the amount of retarding power.

When the on-off switch is in the "on" position, the engine brake shall be automatically applied whenever the accelerator is in the idle position and the automatic transmission is in the lock-up mode. If the accelerator is depressed or if the on-off switch is placed in the "off" position, the engine brake shall immediately release and allow the engine to return to its normal function.

## **EXHAUST OPTIONS**

### **35. Exhaust End Modification**

The end of the exhaust tail pipe shall be modified to accommodate a Plymovent in-house exhaust extraction system. The tail pipe will be at 90 degrees and straight out below the side of body. A stop ring shall be provided on the tail pipe to properly position the Plymovent nozzle. The tail pipe shall be placed in front of the passenger's side rear dual wheels.

# **COOLING PACKAGE**

## **Engine Cooling Package**

### **36. Radiator**

The cooling system shall include an aluminum tube-and-fin radiator with a minimum of 1,408 total square inches of frontal area to ensure adequate cooling under all operating conditions. There shall be a drain valve in the bottom tank to allow the radiator to be serviced. A sight glass shall be included for quick fluid level assessment. The radiator shall be installed at the prescribed angle in order to achieve the maximum operational effectiveness. This shall be accomplished according to established work instructions and properly calibrated angle measurement equipment.

### **37. Silicone Hoses**

All radiator and heater hoses shall be silicone. Pressure compensating band clamps shall be used to eliminate hose pinching on all hoses 3/4" diameter and larger. All radiator hoses shall be routed, loomed, and secured so as to provide maximum protection from chafing, crushing, or contact with other moving parts.

### **38. Coolant**

The cooling system shall be filled with a 50/50 mixture of water and antifreeze/coolant conditioner to provide freezing protection to minus 40 (- 40) degrees F for operation in severe winter temperatures.

### **39. Coolant Recovery**

There shall be a coolant overflow recovery system provided.

### **40. Charge Air Cooler System**

The system shall include a charge air cooler to ensure adequate cooling of the turbocharged air for proper engine operation and maximum performance.

### **41. Charge Air Cooler Hoses**

Charge air cooler hoses shall be made from high-temperature, wire-reinforced silicone to withstand the extremely high temperatures and pressures of the turbocharged air. The hoses shall incorporate a flexible hump section to allow motion and misalignment of the engine relative to the charge air cooler. Charge air cooler hose clamps shall be heavy-duty, constant-torque, T-bolt clamps to ensure proper sealing under all temperatures in order to keep dust and other contaminants out of the engine intake air stream and protect the engine.

### **42. Fan/Shroud**

The fan shall be sized appropriately for maximum airflow and dynamic balance. It shall be made of nylon for strength and corrosion resistance. The fan shall be installed with grade 8 hardware which has been treated with thread locker for additional security. A fan shroud

attached to the radiator shall be provided to prevent recirculation of engine compartment air around the fan in order to maximize the cooling airflow through the radiator. The fan shroud shall be constructed of fiber-reinforced high temperature plastic. The shroud shall be specifically formed with curved surfaces which improves air flow and cooling.

#### **43. Transmission Cooler**

The cooling system shall include a liquid-to-liquid transmission cooler capable of cooling the heat generated from the transmission. When a transmission retarder is selected, the cooler shall have an increased capacity to handle the additional heat load.

## **FUEL SYSTEMS**

#### **44. Fuel System**

One (1) 50 gallon fuel tank shall be provided. The tank shall be of an all-welded, aluminized-steel construction with anti-surge baffles and shall conform to all applicable Federal Highway Administration (FHWA) 393.65 and 393.67 standards. The tank shall be mounted below the frame rails at the rear of the chassis for maximum protection. The tank shall be secured with two (2) wrap-around T-bolt type stainless steel straps. Each strap shall be fitted with protective rubber insulation and shall be secured with grade 8 hardware. This design allows for tank removal from below the chassis. The tank shall be painted or under coated to prevent corrosion or rust from forming.

The fuel tank shall be equipped with a 2" diameter filler neck. The filler neck shall extend to the rear of the vehicle behind the rear tires and away from the heat of the exhaust system as required by NFPA 1901 Standard for Automotive Fire Apparatus. The open end of the filler neck shall be equipped with a twist-off filler cap with a retaining chain.

The tank shall be plumbed with top-draw and top-return fuel lines in order to protect the lines from road debris. Bottom-draw and/or bottom-return fuel lines are not acceptable. A vent shall be provided at the top of the tank. The vent shall be connected to the filler neck to prevent splash-back during fueling operations. A .50" NPT drain plug shall be provided at the bottom of the tank.

The tank shall have a minimum useable capacity of 50 gallons of fuel with a sufficient additional volume to allow for thermal expansion of the fuel without overflowing the vent.

A mechanical fuel pump shall be provided and sized by the engine manufacturer as part of the engine.

Shall provide and access cover or port to allow easy access to the fuel pump if its located in the tank with out having to take tank out to change or service.

#### **45. Fuel Line**

All fuel lines shall be rubber, and meet all industry standards and codes.

## **ALTERNATOR**

## **46.320 AMP Alternator**

There shall be a 320 amp Leece Neville alternator installed as specified. The alternator shall be a Leece Neville 7890JB series brushless type with integral rectifier and adjustable voltage regulator with an output of 275 amps per NFPA 1901 rating (320 amps per SAE J56). The alternator will need to be able to handle the trucks needs for electric draw.

# **BATTERIES**

## **47. Battery System**

The manufacturer shall supply four (4) heavy-duty Group 31 12-volt maintenance-free batteries. Each battery shall be installed and positioned so as to allow easy replacement of any single battery. Each battery shall be equipped with carrying handles to facilitate ease of removal and replacement. There shall be two (2) steel frame-mounted battery boxes, one (1) on the left frame rail and one (1) on the right frame rail. Each battery box shall be secured to the frame rail with Grade 8 hardware. Each battery box shall hold (2) batteries. The batteries shall have a minimum combined rating of 4,000 (4 x 1000) cold cranking amps (CCA) @ 0 degrees Fahrenheit and 820 (4 x 205) minutes of reserve capacity for extended operation. The batteries shall have 3/8-16 threaded stud terminals to ensure tight cable connections. The battery stud terminals shall each be treated with concentrated industrial soft-seal after cable installation to promote corrosion prevention. The positive and negative battery stud terminals and the respective cables shall be clearly marked to ensure quick and mistake-proof identification.

Batteries shall be placed on non-corrosive rubber matting and secured with hold-down brackets to prevent movement, vibration, and road shock. The hold-down bracket J-hooks shall be cut to fit and shall have all sharp edges removed. The batteries shall be placed in plastic trays to provide preliminary containment should there be leakage of hazardous battery fluids. There shall be two (2) plastic trays, each containing (2) batteries. Each battery tray shall be equipped with a rubber vent hose to facilitate drainage. The rubber vent hose shall be routed to drain beneath the battery box. The batteries shall be positioned in well-ventilated areas.

One (1) positive and one (1) negative jumper stud shall be provided below the front driver side of body/pump module. The jumper studs shall be protected from road debris at all times when not in use.

Batteries shall have a minimum warranty of twelve (12) months that shall commence upon the date of delivery of the apparatus.

# **CHASSIS OPTIONS**

## **48. Engine Fan Clutch**

The engine shall be equipped with a thermostatically controlled engine cooling fan. The fan shall be belt driven and utilize a clutch to engage when the engine reaches a specified temperature and / or the water pump is engaged (if equipped).

When disengaged, the fan clutch shall allow for improved performance from optional floor heaters, reduced cab interior noise, increased acceleration and improved fuel economy.

The fan shall be equipped with a fail safe engagement so that if the clutch fails the fan shall engage to prevent engine overheating.

#### **49. Drivelines**

Drivelines shall have a heavy duty metal tube and shall be equipped with Spicer 1710HD universal joints to allow full-transmitted torque to the axle(s). Drive shafts shall be axially straight, concentric with axis and dynamically balanced.

#### **50. Front Tow Eyes**

Two (2) 3/4" thick heavy duty steel tow eyes shall be securely attached to the chassis frame rails at the front of the apparatus. They shall be mounted down below the bumper / cab. The tow hooks shall be chrome plated.

#### **51. Rear Tow Eyes**

Two (2) heavy duty tow eyes made of 3/4" (0.75") thick steel having 2-1/2" diameter holes shall be mounted below the body at the rear of the vehicle to allow towing (not lifting) of the apparatus without damage. The tow eyes will be welded to the lower end that is bolted at the end of the chassis frame rails. The tow eyes shall be painted chassis black.

#### **52. Three (3) Class III Hitch Receivers**

An underbody three (3) way Class III hitch receiver with (3) hitch receiver connections shall be provided.

There shall be three (3) Class III hitch receivers provided below the rear of the body and they shall be of an integral construction to the underbody support assembly.

The rearward facing hitch receiver shall include two (2) tow hook eye connections and an electrical connection for a portable winch application. The two (2) side facing hitch receivers shall be located one (1) each side below the rearward most body compartment. Each side facing hitch receiver shall include an electrical connection for a portable winch application.

Each portable winch connection shall be engineered and rated.

#### **53. Front Bumper Hitch Receiver**

An under front bumper Class III hitch receiver shall be provided. The receiver shall be constructed of steel tubing and attached to the chassis framing. An electrical connection shall be provided for use with a portable winch.

The portable winch connection shall be rated for a maximum of 8,000 pounds.

## **54.DEF Tank**

A diesel exhaust fluid (DEF) tank with a five (5) gallon capacity shall be provided.

The DEF tank shall include a heater fed by hot water directly from the engine block to prevent the DEF from becoming too cool to operate correctly per EPA requirements. The tank shall include a temperature sensor to control the heater control valve that controls the feed of hot water from the engine to the DEF tank heater.

A sender shall be provided in the DEF tank connected to a level gauge on the cab dash.

The tank shall be located left side below rear of cab. Or other applicable place to allow ease of filling the tank when needed.

## **CAB MODEL**

The vehicle shall be distinguished by an all-welded aluminum and fully enclosed tilt cab. The cab shall be designed exclusively for fire/rescue service and shall be pre-engineered to ensure long life. It shall incorporate an integral welded substructure of high-strength aluminum alloy extrusions.

The cab shall be constructed from aluminum alloy plate roof, floor, and outer skins welded to a high-strength aluminum alloy sub frame. Wall supports and roof bows are aluminum alloy.

The inner structure shall be designed to create an interlocking internal "roll-cage" effect by welding.

The subframe structure shall be constructed from high-strength aluminum welded together to provide a structural base for the cab. It shall include a side-to-side C-channel extrusion across the front, full-width cross member tubes spaced at critical points between the front and rear of the cab.

The cab floor shall be constructed from smooth aluminum plate welded to the subframe structure to give the cab additional strength and to help protect the occupants from penetration by road debris and under-ride collision impacts.

The cab roof shall be constructed from aluminum tread plate supported by a grid of fore-aft and side-to-side aluminum to help protect the occupants from penetration by falling debris and downward-projecting objects. Molded fiberglass or other molded fiber-reinforced plastic roof materials are not acceptable.

The cab roof perimeter shall be constructed from aluminum with integral drip rails or other construction methods having the same results. The roof perimeter shall be continuously welded to the cab roof plate to ensure a leak-free roof structure.

The cab rear skin shall be constructed from aluminum plate. Structural extrusions shall be used to reinforce the rear wall.

The left-hand and right-hand cab side skins shall be constructed from smooth aluminum plate. The skins shall be welded to structural aluminum extrusions at the top, bottom, and sides for additional reinforcement.

The cab front skins shall be constructed from smooth aluminum plate. The upper portion shall form the windshield mask, and the lower portion shall form the cab front. Each front corner shall have a full outer radius for strength and appearance. The left-hand and right-hand sides of the windshield mask shall be welded to the left-hand and right-hand front door frames, and the upper edge of the windshield mask shall be welded to the cab roof perimeter extrusion for reinforcement. The cab front shall be welded to the subframe below the line of the headlights to provide protection against frontal impact.

## **55. Cab Exterior**

The exterior of the cab shall approximately 94” wide x 130” long to allow sufficient room in the occupant compartment for up to Four (4) fire fighters.

Front axle fenderette trim shall be brushed aluminum for appearance and corrosion resistance. Bolt-in front wheel well liners shall be constructed of composite material to provide a maintenance-free, damage-resistant surface that helps protect the underside of the cab structure and components from stones and road debris.

The cab windshield shall be of a two-piece replaceable design for lowered cost of repair. The windshield shall be made from curved, laminated safety glass with a 75% light transmittance automotive tint. Forward visibility to the ground for the average (50<sup>th</sup> percentile) male sitting in the driver’s seat shall be no more than 11 feet 7 inches from the front of the cab to ensure good visibility in congested areas.

## **56. Cab Mounts and Cab Tilt System**

The cab shall be independently mounted from the body and chassis to isolate the cab structure from stresses caused by chassis twisting and body movements. Mounting points shall consist of two (2) forward-pivoting points, one (1) on each side; two (2) intermediate rubber load-bearing cushions located midway along the length of the cab, one on each side; and two (2) combination rubber shock mounts and cab latches located at the rear of the cab, one (1) on each side.

An electric-over-hydraulic cab tilt system shall be provided to provide easy access to the engine, with a frame-mounted electric-over-hydraulic pump for cylinder actuation.

Safety flow fuses (velocity fuses) shall be provided in the hydraulic lift cylinders to prevent the raised cab from suddenly dropping in case of a burst hydraulic hose or other hydraulic failure. The safety flow fuses shall operate when the cab is in any position, not just the fully raised position.

The hydraulic pump shall have a manual override system as a backup in the event of an electrical failure. Lift controls shall be located in a compartment to the rear of the cab on the

right side of the apparatus. A parking brake interlock shall be provided as a safety feature to prevent the cab from being tilted unless the parking break is set.

The entire cab shall be tilted through a 42-45 degree arc to allow for easy maintenance of the engine, transmission and engine components. A positive-engagement safety latch shall be provided to lock the cab in the full tilt position to provide additional safety for personnel working under the raised cab.

In the lowered position, the cab shall be locked down by two (2) automatic, spring-loaded cab latches at the rear of the cab. A "cab ajar" indicator light shall be provided on the instrument panel to warn the driver when the cab is not completely locked into the lowered position.

## **57. Cab Interior**

The interior of the cab shall be of the open design with an ergonomically-designed driver area that provides ready access to all controls as well as a clear view of critical instrumentation.

The engine cover between the driver and the officer shall be a low-rise contoured design to provide sufficient seating and elbow room for the driver and the officer. The engine cover shall blend in smoothly with the interior dash and flooring of the cab.

The rear portion of the engine cover shall be provided with a lift-up section to provide easy access for checking transmission fluid, power steering fluid, and engine oil without raising the cab. The engine cover insulation shall consist of fiberglass composite panels with foil backing manufactured to specifically fit the engine cover without modification to eliminate "sagging" as found with foam insulation. The insulation shall meet or exceed DOT standard MVSS 302-1 and V-0 (UI subject 94 Test).

All cab floors shall be covered with a black rubber floor mat that provides an aggressive slip-resistant surface in accordance with current NFPA 1901.

A minimum floor-to-ceiling height shall be provided in the front seating area of the cab and a minimum floor-to-ceiling height shall be provided in the rear seating area. Provide the dimensions for the floor to ceiling in the cab.

The floor area in front of the front seat pedestals shall be no less than 20.5" side to side by 25.0" front to rear for the driver and no less than 20.5" side to side by 26.0" front to rear for the officer to provide adequate legroom.

All exposed interior metal surfaces shall be pretreated using a corrosion prevention system.

The interior of the cab shall be insulated to ensure the sound (dbA) level for the cab interior is within the limits stated in the current edition of NFPA 1901. Interior cab padding shall consist of a rear cab headliner, a rear wall panel, and side panels between the front and rear cab doors.

The overhead console and heater cover shall be covered non-metallic, non-fiber trim pieces to provide excellent scuff and abrasion resistance, as well as chemical stain resistance. The thermoformed material shall comply with Federal Motor Vehicle Safety Standard (FMVSS) 302 for flammability of interior materials.

The vehicle shall use a seven-position tilt and telescopic steering column to accommodate various size operators. An 18" padded steering wheel with a center horn button shall be provided.

A full-width overhead console shall be mounted to the cab ceiling for placement of siren and radio heads, and for warning light switches. The console shall be made from a, non-metallic material and shall have easily removable mounting plates.

Storage areas, with hinged access doors, shall be provided below the driver and officer seats. The driver side compartment shall be approximately 20" x 12" x 3.5" high and the officer side compartment shall be approximately 20.25" x 22.75" x 11" high (20" x 12" x 3.5" high w/ air ride).

The front cab steps shall be a minimum of 8" deep x 24" wide. The first step shall be no more than 24.0" above the ground with standard tires in the unloaded condition per NFPA 1901 standards. The rear cab steps shall be a minimum 12" deep x 21" wide. The first step shall be no more than 24.0" above the ground with standard tires in the unloaded condition per NFPA 1901 standards. The rear steps shall incorporate intermediate steps for easy access to the cab. The steps are to be located inside the doorsill, where they are protected against mud, snow, ice, and weather. The step surfaces shall be aluminum diamond plate with a multi-directional, aggressive gripping surface incorporated into the aluminum diamond plate in accordance with current NFPA 1901.

A black rubber grip handle (or comparable) shall be provided on the interior of each front door below the door window to ensure proper hand holds while entering and exiting the cab. An additional black rubber grip handle shall be provided on the left and right side windshield post for additional handholds.

## **58. Cab Doors**

There shall be reflective material on each cab door in compliance with all NFPA requirements.

Four (4) side-opening cab doors shall be provided. The framework to provide a structure that is as strong as the side skins.

Front cab the front doors shall open approximately 75 degrees, and the rear doors shall open approximately 80 degrees.

The doors shall be securely fastened to the doorframes with full-length, stainless steel piano hinges, long life, and corrosion resistance. Mounting hardware shall be treated with corrosion-resistant material prior to installation. For effective sealing, an extruded rubber gasket shall be provided around the entire perimeter of all doors.

Stainless steel paddle-style door latches shall be provided on the interiors of the doors. The latches shall be designed and installed to protect against accidental or inadvertent opening as required by NFPA 1901.

The front door windows shall provide a minimum clear viewing area. The rear door windows shall provide a minimum clear viewing area. All windows shall have 75% light transmittance automotive safety tint. Full roll-down windows shall be provided for the front cab doors with

worm gear drive cable operation for positive operation and long life. Scissors or gear-and-sector drives are not acceptable.

## **59. Cab Instruments and Controls**

Two (2) pantograph-style windshield wipers with two (2) separate electric motors shall be provided for positive operation. Air-operated windshield wipers are not acceptable because of their tendency to accumulate moisture, which can lead to corrosion or to freezing in cold weather. The wipers shall be a wet-arm type with a one (1) gallon washer fluid reservoir, an intermittent-wipe function, and an integral wash circuit. Wiper arm length shall be approximately 28", and the blade length approximately 20". Each arm shall have a 70 degree sweep for full coverage of the windshield.

An overhead mounted heater and defroster with a minimum capacity of 60,000 Btu/hr or higher, and all necessary controls shall be mounted in the cab. The airflow system shall consist of two (2) levels, defrost and cab, and shall have fresh air and defogging capabilities.

Cab controls shall be located on the cab instrument panel in the dashboard on the driver's side where they are clearly visible and easily reachable. Emergency warning light switches shall be installed in removable panels for ease of service. The following gauges and/or controls shall be provided:

- Master battery switch/ignition switch (rocker with integral indicator)
- Starter switch/engine stop switch (rocker)
- Heater and defroster controls with illumination
- Marker light/headlight control switch with dimmer switch
- Self-canceling turn signal control with indicators
- Windshield wiper switch with intermittent control and washer control
- Master warning light switch
- Transmission oil temperature gauge
- Air filter restriction indicator
- Pump shift control with green "pump in gear" and "o.k. to pump" indicator lights
- Parking brake controls with red indicator light on dash
- Automatic transmission shift console
- Electric horn button at center of steering wheel
- Cab ajar warning light on the message center enunciator

Controls and switches shall be identified as to their function by backlit wording adjacent to each switch, or indirect panel lighting adjacent to the controls.

## **60. Fast Idle System**

A fast idle system shall be provided and controlled by the cab-mounted switch. The system shall increase engine idle speed to a preset RPM for increased alternator output.

## **61. Electrical System**

The cab and chassis system shall have a centrally located electrical distribution area. All electrical components shall be located such that standard operations shall not interfere with or disrupt vehicle operation. An automatic thermal-reset master circuit breaker compatible with the

alternator size shall be provided. Automatic-reset circuit breakers shall be used for directional lights, cab heater, battery power, ignition, and other circuits. An access cover shall be provided for maintenance access to the electrical distribution area.

A 6 place, constantly hot and 6 place ignition switched fuse panel and ground for customer-installed radios and chargers shall be provided at the electrical distribution area. Radio suppression shall be sufficient to allow radio equipment operation without interference.

All wiring shall be mounted in the chassis frame and protected from impact, abrasion, water, ice, and heat sources. The wiring shall be color-coded and functionally-labeled every 3" on the outer surface of the insulation for ease of identification and maintenance. The wiring harness shall conform to SAE 1127 with GXL temperature properties. Any wiring connections exposed to the outside environment shall be weather-resistant. All harnesses shall be covered in a loom that is rated at 280 degrees F to protect the wiring against heat and abrasion.

A Vehicle Data Computer (VDC) shall be supplied within the electrical system to process and distribute engine and transmission Electronic Control Module (ECM) information to chassis system gauges, the message center, and related pump panel gauges. Communications between the VDC and chassis system gauges shall be through a 4 wire multiplexed communication system to ensure accurate engine and transmission data is provided at the cab dash and pump. The VDC shall be protected against corrosion, excessive heat, vibration, and physical damage.

Two (2) dual rectangular sealed beam halogen headlights shall be installed on the front of the cab, one (1) on each side, mounted in a polished chrome-plated bezel. The low beam headlights shall activate with the release of the parking brake to provide daytime running lights (DRL) for additional vehicle conspicuity and safety. The headlight switch shall automatically override the DRL for normal low beam/high beam operation.

## **62. Cab Crashworthiness Requirement**

The apparatus cab shall meet and/or exceed relevant NFPA 1901 load and impact tests required for compliance certification with the following:

### **Side Impact Dynamic Pre-Load per SAE J2422 (Section 5).**

Testing shall meet and/or exceed defined test using 13,000 ft-lbs of force as a requirement. The cab shall be subject to a side impact representing the force seen in a roll-over. The cab shall exhibit minimal to no intrusion into the cab's occupant survival space, doors shall remain closed and cab shall remain attached to frame.

### **Quasi-static Roof Strength (proof loads) per SAE J2422 (Section 6) / ECE R29, Annex 3, paragraph 5.**

Testing shall meet and/or exceed defined test using 22,046 lbs of mass as a requirement. Testing shall be completed using platen(s) distributed uniformly over all bearing members of the cab roof structure.

Cab testing shall be completed **exceeding** testing requirements. The cab shall exhibit minimal to no intrusion into the cab's occupant survival space and doors shall remain closed.

The cab shall exhibit minimal to no intrusion into the cab's occupant survival space and the doors shall remain closed.

### **Frontal Impact per SAE J2420.**

Testing shall meet and/or exceed defined test using 32,549 ft-lbs of force as a requirement. The cab shall be subject to a frontal impact as defined by the standard. The cab shall exhibit minimal to no intrusion into the cab's occupant survival space, doors shall remain closed and cab shall remain attached to frame.

The cab shall meet all requirements to the above cab crash worthiness; **NO EXCEPTIONS.**

A copy of a certificate or letter verifying compliance to the above performance by an independent, licensed, professional engineer shall be provided upon request.

For any or all of the above tests, the cab manufacturer shall provide either photographs or video footage of the procedure upon request.

### **63.ISO Compliance**

The manufacturer shall ensure that the construction of the apparatus cab shall be in conformance with the established ISO-compliant quality system. All written quality procedures and other procedures referenced within the pages of the manufacturer's Quality Manual, as well as all Work Instructions, Workmanship Standards, and Calibration Administration that directly or indirectly impacts this process shall be strictly adhered to. By virtue of its ISO compliance the manufacturer shall provide an apparatus cab that is built to exacting standards, meets the customer's expectations, and satisfies the customer's requirements.

## **CAB ROOF TYPE**

### **64.Raised Roof**

The rear portion of the cab roof shall be raised approximately 12". This will provide at least 5' 7" standing room. The front of the vista hood shall be sloped at 45 degrees from the vertical. The slope shall begin slightly in front of the centerline of the front axle to leave room for warning lights and air conditioning in front of the vista. The main roof extrusion shall extend up into the vista to strengthen the roof perimeter. Windows shall be provided on front, side, and rear.

The rear door shall have an 85" vertical dimension for improved ingress/egress characteristics. The door shall be equipped with a dual striker bolt system.

## **CAB BADGE PACKAGE**

### **65.Logo Package**

Give full description of all "logo" placements on the truck.

## **GRILLE**

## **66.GRILLE, ABS CHROME**

The front cooling air intake grille shall be constructed of stainless steel mesh and supported by an impact-resistant chrome plated ABS frame providing no less than 81% open area for excellent cooling performance.

## **CAB DOOR OPTIONS**

### **67.Rear Cab Door Position**

The cab rear doors shall be moved to the rear of the wheel opening. This door placement facilitates easier entry and egress by reducing the rear facing seat protrusion into the door opening.

### **68.Cab Front Door Windows**

Driver and officer door windows shall have the support pillar located toward the front of the window.

### **69.Cab Front Windows**

The front windows of the cab shall be electrically operated to raise and lower. The driver shall have control of both electric windows; the officer seat will have operation of the officer side window only.

### **70.Cab Door Rear Windows**

The rear cab door window(s) shall be manual fore/aft slider type or manually operated to raise and lower same as front windows.

### **71.Cab Door Locks**

Each cab door shall have a manually operated door lock actuated from the interior of each respective door. Exterior of each cab door shall be provided with a barrel style keyed lock below the cab door handle. All locks keyed the same for all door locks.

### **72.Cab Door Locks**

The cab shall be keyed a like door locks provided on exterior doors to secure the apparatus.

### **73.Cab Door Panels**

The inner cab door panels shall be made from, non-metallic, non-fiber ABS material for increased durability and sound deadening. The cab door panels shall incorporate an easily removable panel for access to the latching mechanism for maintenance or service.

#### **74. Cab Door Exterior Latches**

All cab doors shall have "L" style exterior door latches.

#### **75. Cab Door Kick Plate**

All cab doors shall have aluminum or comparable kick plates installed on the interior lower portion of the doors.

#### **76. Cab Step Area Lighting**

There shall be four (4) clear incandescent lights or LED's provided to illuminate the cab step well area. Each light shall be located on each cab door in the inboard position. Each light shall be activated by the cab door ajar circuit.

#### **77. Cab Door Reflective Material**

Reflective Yellow/Red material striping shall be supplied on each of the lower cab doors. The stripes shall run from the lower outer corner to the top upper corner of the panel, forming an "A" shape when viewed from the rear. The reflective material shall meet NFPA 1901 requirements.

### **MIRRORS**

#### **78. Cab Mirrors**

There shall be two (2) mirrors provided, one (1) driver's and one (1) officer's side. The mirrors shall be chrome-plated on the main head, be remote controlled with a four way power system and be heated. There shall be LED marker lights with bezel on the main head, and LED arrow lights in the mirror glass. The main flat glass shall provide 120 square inches of viewable surface space. Or comparable mirrors with specifications attached to proposal.

There shall be separate heads for the driver's and officer's side housing convex glass and provide 56 square inches of viewing surface.

The mirrors shall be mounted on the cab doors.

### **MISC EXTERIOR CAB OPTIONS**

#### **79. Cab Canopy Window**

There shall be a fixed window provided between the front and rear doors on the driver`s side of the cab.

### **80.Cab Canopy Window**

There shall be a fixed window provided between the front and rear doors on the officer`s side of the cab.

### **81.Front Mud Flaps**

Black linear low density polyethylene (proprietary blend) mud flaps shall be installed on the rear of the cab front wheel wells. The design of the mud flaps shall have corrugated ridges to distribute water evenly.

### **82.Handrails**

Cab door assist handrails shall consist of two (2) mounted directly behind the driver and officer door openings one each side of the cab. The handrails shall be machine extruded with integral ribbed surfaces to assure a good grip for personnel safety. Handrails shall be installed between chrome end stanchions and shall be positioned at least 2” from the mounting surface to allow a positive grip with a gloved hand.

### **83.Handrails**

Cab door assist handrails shall consist of two (2) mounted directly behind the driver and officer rear door openings one each side of the cab. The handrails shall be machine extruded with integral ribbed surfaces to assure a good grip for personnel safety. Handrails shall be installed between chrome end stanchions and shall be positioned at least 2” from the mounting surface to allow a positive grip with a gloved hand.

### **84.Rear Cab Wall Construction**

The rear cab wall shall be constructed with the use aluminum or comparable diamond plate interlocking.

## **HVAC**

### **85.Air Conditioning**

An overhead air-conditioner / heater system with a single radiator mounted condenser shall be supplied.

The unit shall be mounted to the cab interior headliner in a mid cab position, away from all seating positions. The unit shall provide the appropriate comfort discharge louvers, to the back area of the cab. These louvers will be used for AC and heat air delivery. Two (2) additional large front louvers shall be damper controlled to provide defogging and defrosting capabilities to the front windshield as necessary.

The unit shall consist of a high output evaporator coil and heater core with one (1) high output dual blower for front air delivery, and two (2) high performance single wheel blowers for rear air delivery.

The control panel shall actuate the air-distribution system with air cylinders, which are to be separated from the brake system by an 85-90 psi pressure protection valve. A three-speed blower switch shall control air speed.

The condenser shall be radiator mounted and have a minimum capacity of 65,000 BTU`s and shall include a receiver drier.

Performance Data: (Unit only, no ducting or louvers)

AC BTU: 55,000

Heat BTU: 65,000

CFM : 1300 @ 13.8V (All blowers)

The system shall be capable of cooling the interior of the cab from 100 degrees ambient to 75 degrees or less with 50% relative humidity in 30 minutes or less.

### **86.Heat, Supplemental**

A single 40,000 BTU water heater shall be supplied in the front area of the cab. The unit shall heat the lower section of the driver`s and officer`s foot well.

Dual 23,000 BTU water heaters with diamond plate covers shall be supplied in the rear of the cab to heat the rear cab lower section.

Dual climate control will be achieved via dual switches installed on a front instrument panel.

## **SEATS**

### **87.Seating**

All seats shall be Seats, Inc. 911 brand.

### **88.Seat, Driver**

Seats, Inc 911 air suspension seat shall be supplied for the driver`s position.

Features shall include:

- Universal styling
- High back seat back
- Low profile air suspension assembly with rubber accordion cover
- Weight, height and ride adjustment

- Built-in back and lumbar adjustment
- 4” fore and aft adjustment

All seat positions shall have a bright red retractable 3-point lap and shoulder harness, providing additional safety and security for personnel. Extensions shall be provided with the seat belts so the male end can be easily grasped and the female end easily located while sitting in a normal position.

### **89.Seat, Officer**

One (1) Seats, Inc. 911 Universal fixed SCBA seat shall be supplied for the officer`s position in front of the cab to the right of the driver`s position.

Features shall include:

- Universal styling.
- High back seat back.
- Built-in back and lumbar adjustment.
- Easy exit, flip up, and split headrest for improved exit with SCBA.

All seat positions shall have a bright red retractable 3-point lap and shoulder harness, providing additional safety and security for personnel. Extensions shall be provided with the seat belts so the male end can be easily grasped and the female end easily located while sitting in a normal position.

### **90.Seat, forward facing**

One (2) Seats, Inc. 911 Universal SCBA seat shall be provided in the forward facing position.

Features shall include:

- Universal styling.
- High back seat back.
- Easy exit, flip up, and split headrest for improved exit with SCBA.

All seat positions shall have a bright red retractable 3-point lap and shoulder harness, providing additional safety and security for personnel. Extensions shall be provided with the seat belts so the male end can be easily grasped and the female end easily located while sitting in a normal position.

### **91.Seat Cover Material**

All seats shall have seat cover material that conforms to industry standards and color coordinated with the rest of the cab.

### **92.Seat Fabric Color**

All seats shall be gray in color.

### **93. Seating Capacity Tag**

A tag that is in view of the driver stating seating capacity of four (4) personnel shall be provided.

### **94. Mechanical Air Pack Bottle Bracket**

Ziamatic model QLM-U-OPR mechanical SCBA bottle bracket(s) shall be provided to fit all SCBA bottles currently on the market. The bracket(s) shall be positive locking and be equipped with an adjustable footplate and pull release strap.

The SCBA bracket(s) shall be equipped with a PVC coated flip-down restraint to securely lock the SCBA in place without damaging the cylinder wall.

The bracket(s) shall be located officer's seat, rear forward facing driver's side, rear forward facing officer's side.

## **MISC INTERIOR CAB OPTIONS**

### **95. Cab Interior Color**

Cab instrument panel, overhead console, trim panels, headliner, and door panels shall be gray.

### **96. Sun Visors**

Padded sun visors shall be provided for the driver and officer matching the interior trim of the cab and shall be flush mounted into the underside of the overhead console.

### **97. Cab Dash**

All surfaces subject to repeated contact and wear -- the center and officer side dash, windshield "A" post covers and lower front kick panels -- shall be covered with thermoformed, non-metallic, non-fiber trim pieces to provide excellent scuff and abrasion resistance, as well as chemical stain resistance. The thermoformed material shall comply with Federal Motor Vehicle Safety Standard (FMVSS) 302 for flammability of interior materials.

### **98. Engine Cover**

The engine cover shall blend in smoothly with the interior dash and flooring of the cab. The cover shall be constructed from a combination of integral skinned polyurethane foam and thermoformed, non-metallic, non-fiber trim pieces or panels to provide excellent scuff and abrasion resistance, as well as chemical stain resistance. The material shall comply with Federal Motor Vehicle Safety Standard (FMVSS) 302 for flammability of interior materials.

The top front center of the engine cover shall be molded and shall provide to reduce the transmission noise and heat from the engine.

On either side of the engine cover top surface there shall be trim with integral padded arm rests for both the driver and the officer. The trim shall include large cup holders ahead of each arm rest.

The engine service access door shall be covered with a thermoformed ABS panel with a shallow recess in the top surface.

## **CAB ELECTRICAL OPTIONS**

### **99. Cab Dome Lights**

A dome light assembly with two (2) incandescent bulbs with one (1) white lens and one (1) red lens and plastic housing shall be installed. The white light activates with appropriate cab door and light assembly mounted push-button switch, the red light activates with light assembly mounted push-button switch only.

There shall be two (2) mounted in the front of the cab, one (1) in the driver and one (1) in the officer ceiling.

There shall be two (2) mounted in the rear of the cab, one (1) in the driver side and one (1) in the officer side ceiling.

### **100. Clamshell Switch**

A heavy-duty metal clamshell switch shall be installed on the officer's side of the engine cover to operate the Q2B.

### **101. Clamshell Switch**

A heavy-duty metal clamshell switch shall be installed on the officer's side of the engine cover to operate the siren.

### **102. Battery Charger Receptacle**

The battery charger receptacle shall be placed in the same area as the air inlet and have a cover placed over the receptacle.

### **103. Switch Horn Button Two Position**

A two (2) position rocker switch shall be installed in the cab dash and properly labeled to enable operator to activate one of the following from the steering wheel horn button: OEM Traffic horn or Federal Signal Q2B.

#### **104. DPF Regeneration Override**

An override switch shall be provided for the Diesel Particulate Filter (DPF) regeneration. The switch will inhibit the regeneration process until the switch is reset or the engine is shut down and restarted. The switch shall be located within reach of the driver.

#### **105. English Dominant Gauge Cluster**

The cab operational instruments shall be located in the dashboard on the driver side of the cab and shall be clearly visible. The gauges in this panel shall be English dominant and shall be the following:

- Speedometer/Odometer
- Tachometer with integral hour meter
- Engine oil pressure gauge with warning light and buzzer
- Engine water temperature gauge with warning light and buzzer
- Two (2) air pressure gauges with a warning light and buzzer (front air and rear air)
- Fuel gauge
- Voltmeter
- Transmission oil temperature gauge

The panel shall have a hour meter install for monitoring engine hours.

This panel shall be backlit for increased visibility during day and night time operations.

#### **106. Cab Turn Signals**

There shall be a pair of Federal Signal Quadra Flare model QL64Z-ARROW LED (Light Emitting Diode) turn signal light heads with populated arrow pattern and amber lens mounted upper headlight bezel and wired with weatherproof connectors.

#### **107. Battery Charger**

The battery charging system shall be installed and connected directly to the shoreline to ensure the batteries remain fully charged while the vehicle is in the fire station or firehouse.

The system shall provide a visual signal if battery voltage drops below 11.5 volts. The microprocessor shall be continuously powered from the battery to provide the charge status.

Equalization charge shall only occur when necessary, not with every cycle. The system shall fully charge the batteries while allowing up to 8 amps of additional load for onboard systems.

#### **108. Clamshell Switch**

A heavy-duty metal clamshell switch shall be installed on the officer's side of the engine cover to operate the air horns.

### **109. Battery Charger Location**

The battery charger shall be located behind driver's seat.

## **BODY COMPT LEFT SIDE**

### **110. Driver Side Assembly**

The driver side assembly shall be constructed entirely of aluminum or equivalent and interlocking aluminum plates. This aluminum modular design shall provide a high strength-to-weight ratio for increased equipment carrying capacity.

The driver side body shall be completely sanded and deburred to assure a smooth finish and painted job color.

### **111. Driver Side Compartments**

The three (3) driver side compartments shall be constructed from smooth aluminum plate. The compartments shall be modular in design and shall not be a part of the body support structure.

There shall be one (1) compartment located ahead of the rear wheel. The compartment shall be approximately 42" wide x 68" high x 26" deep in the lower 30" high section and 12" deep in the upper 38" high section. The compartment shall contain approximately 30 cu. ft. of combined storage space. The door opening shall be approximately 42" wide x 68" high.

There shall be one (1) compartment located over the rear wheel. The compartment shall be approximately 56" wide x 34" high x 12" deep and contain approximately 13.2 cu. ft. of storage space. The door opening shall be approximately 56" wide x 34" high.

There shall be one (1) compartment located behind the rear wheel. The compartment shall be approximately 56" wide x 68" high. The forward area of the compartment shall be 42" wide x 30" high x 26" deep in the lower area and 42" wide x 38" high x 12" deep in the upper area. The enhanced extended rear portion of the compartment shall be approximately 14" wide x 68" high x 25" deep in the lower 30" high section and 11" deep in the upper 38" high section. The total combined storage space shall be approximately 39.5 cu. ft. The door opening shall be approximately 56" wide x 68" high.

Each compartment seam shall be sealed using a permanent pliable silicone caulk. The walls of each compartment shall be machine-louvered for adequate ventilation.

### **112. Storage Tunnel**

The area directly behind the upper area of the driver side compartments shall be for the storage of NFPA ladders and/or equipment.

## **BODY COMPT RIGHT SIDE**

### **113. Officer Side Assembly**

The officer side assembly shall be constructed entirely of aluminum or equivalent and interlocking aluminum plates. This aluminum modular design shall provide a high strength-to-weight ratio for increased equipment carrying capacity.

The officer side body shall be completely sanded and deburred to assure a smooth finish and painted job color.

### **114. Officer Side Compartments**

The three (3) officer side compartments shall be smooth aluminum plate. The compartments shall be modular in design and shall not be a part of the body support structure.

There shall be one (1) compartment located ahead of the rear wheel. The compartment shall be approximately 42" wide x 68" high x 26" deep in the lower 30" high section and 12" deep in the upper 38" high section. The compartment shall contain approximately 30 cu. ft. of combined storage space. The door opening shall be approximately 42" wide x 68" high.

There shall be one (1) compartment located over the rear wheel. The compartment shall be approximately 56" wide x 34" high x 12" deep and contain approximately 13.2 cu. ft. of storage space. The door opening shall be approximately 56" wide x 34" high.

There shall be one (1) compartment located behind the rear wheel. The compartment shall be approximately 56" wide x 68" high. The forward area of the compartment shall be 42" wide x 30" high x 26" deep in the lower area and 42" wide x 38" high x 12" deep in the upper area. The enhanced extended rear portion of the compartment shall be approximately 14" wide x 68" high x 25" deep in the lower 30" high section and 11" deep in the upper 38" high section. The total combined storage space shall be approximately 39.5 cu. ft. The door opening shall be approximately 56" wide x 68" high.

Each compartment seam shall be sealed using a permanent pliable silicone caulk. The walls of each compartment shall be machine-louvered for adequate ventilation.

An externally-mounted compartment top shall be provided and constructed of a 1/8" (.125") aluminum tread plate.

### **115. Storage Tunnel**

The area directly behind the upper area of the officer side compartments shall be for the storage of NFPA equipment.

## **BODY COMPT REAR**

## **116. Rear Body Assembly**

The rear body shall be constructed entirely of aluminum or equivalent and interlocking aluminum plates and includes a full height center rear compartment.

## **117. Rear Body Compartment**

The full height center rear compartment shall be constructed from smooth aluminum plate. The compartment shall be modular in design and shall not be a part of the body support structure.

The compartment shall be approximately 38" wide and shall vary in height and depth dependent upon water tank capacity.

The compartment seams shall be sealed using a permanent pliable silicone caulk. Machined louvers shall be provided for adequate ventilation.

## **118. Storage Compartments**

Two (2) storage compartments shall be provided at the rear body compartment. The storage compartments shall be located to the driver and officer side of the rear compartment.

The driver side storage compartment shall be approximately 13" wide x 29" high x length of side assembly. The storage compartment shall store NFPA Hard Suction and/or equipment.

The officer side storage compartment shall be approximately 13" wide x 29" high x length of side assembly. The storage compartment shall store NFPA ladder and/or equipment.

The storage compartments shall include vertically hinged doors to secure contents. The doors shall be constructed of aluminum plate and shall have a push-button style latch. The compartment doors shall be securely attached with a full-length stainless steel piano type hinge with 1/4" pin. The hinges shall be "staked" on every other knuckle to prevent the pins from sliding. The doors shall be wired to the door ajar indicator light in the cab and shall be interlocked with the parking brake per NFPA.

## **119. Tailboard Step**

A tailboard step shall be provided at the rear of the body. The tailboard shall 15.5" in depth and in accordance with NFPA in both step height and stepping surface. The maximum rear step height to the tailboard shall not exceed 24".

The tailboard step shall be aluminum tread plate and shall be reinforced with aluminum extrusion. The tailboard shall be in accordance with current NFPA requirements and shall include a multi-directional aggressive gripping surface incorporated into the diamond plate.

The tailboard step shall be bolted on to the body from the underside assuring a clear surface and shall be easily removable for replacement in the case of damage.

## **120. Rear Access Handrails**

Handrails shall be provided at the rear of the body to assist ground personnel accessing the tailboard step and hose bed area. Hand rails shall be provided for safety, with an integral ribbed surface to assure a good grip for personnel safety, and shall be mounted between chrome stanchions.

The handrails shall be located- two (2) handrails, one (1) on each side, appropriately sized handrail mounted vertically on the trailing edge of the body and appropriately sized handrail(s) mounted horizontally below the rear hose bed opening.

### **121. Enhanced Extended**

Enhanced Extended Compartmentation stepped down below hose bed level.

## **DOORS**

### **122. Double Compartment Door**

Double compartment doors shall be constructed using a box pan configuration. The outer door pans shall beveled and shall be constructed aluminum plate. Inner door pans shall be constructed from smooth aluminum plate and shall have nutsert fittings to attach hold-open hardware.

The compartment doors shall have a closed-cell sponge gasket meeting ASTM D-1066 2A4 standards installed around the perimeter of the doors to provide a seal that is resistant to oil, sunlight, and ozone.

A drain hole shall be installed in the lower corner of the inside door pan to assist with drainage.

A polished stainless steel Hansen D-ring style twist-lock door handle with #459 latch shall be provided on the primary door. The 4-1/2" (4.5") D-ring handle shall be mounted directly to the door latching mechanism with screws that do not penetrate the door material for improved corrosion resistance. The secondary door shall have a positive latching mechanism to hold the door in the closed position.

The compartment doors shall be securely attached to the apparatus body with a full-length stainless steel rod piano-type hinge isolated from the body and compartment doors with a dielectric barrier. The doors shall be attached with machine screws threaded into the doorframe. The doors shall have a gas shock-style hold-open device.

An anodized aluminum or comparable drip rail shall be mounted over the compartment opening to assist in directing water runoff away from the compartment.

The door(s) shall be installed in the following location(s): L1, L3, R1, R3

### **123. Single Compartment Door**

A single compartment door shall be constructed using a box pan configuration. The outer door pan shall beveled and shall be constructed from aluminum plate. The inner door pan shall be constructed from smooth aluminum plate and shall have fittings to attach hold-open hardware. The inner pan shall have a 95-degree bend to form an integral drip rail.

The compartment door shall have a closed-cell sponge gasket meeting ASTM D-1066 2A4 standards installed around the perimeter of the door to provide a seal that is resistant to oil, sunlight, and ozone.

A drain hole shall be installed in the lower corner of the inside door pan to assist with drainage.

A polished stainless steel Hansen D-ring style twist-lock door handle with #459 latch shall be provided on the door. The 4-1/2" (4.5") D-ring handle shall be mounted directly to the door latching mechanism with screws that do not penetrate the door material for improved corrosion resistance.

The compartment door shall be securely attached to the apparatus body with a full-length stainless steel rod piano-type hinge isolated from the body and compartment door with a dielectric barrier. The door shall be attached with machine screws threaded into the doorframe. The door shall have gas shock-style hold-open devices.

An anodized aluminum or comparable drip rail shall be mounted over the compartment opening to assist in directing water runoff away from the compartment.

The door(s) shall be installed in the following location(s): L2, R2

#### **124. Roll Up Compartment Door**

A roll up door with satin finish shall be provided on a compartment greater than 45" tall. The door(s) shall be installed in the following location(s): B1.

The door slats shall be double wall box frame and manufactured from anodized aluminum. The slats shall have interlocking end shoes on each slat. The slats shall have interlocking joints with a PVC/vinyl inner seal to prevent any metal to metal contact and inhibit moisture and dust penetration.

The track shall be anodized aluminum or equivalent with a finishing flange incorporated to provide a finished look around the perimeter of the door without additional trim or caulking. The track shall have a replaceable side seal to prevent water and dust from entering the compartment.

The doors shall be counterbalanced for ease in operation. A full width latch bar shall be operable with one hand, even with heavy gloves. Securing method shall be a positive latch device.

A magnetic type switch integral to the door shall be supplied for door ajar indication and compartment light activation.

The door opening shall be reduced by 2" in width and approximately 8-9" in height depending on door height.

## **SHELVES**

#### **125. Permanent Shelf**

There shall be a permanent mounted aluminum shelf provided for compartment R1 at offset (above extrusion if applicable), R3 at offset (above extrusion if applicable). The shelf shall be at the offset within the compartment.

The shelf shall be constructed of 3/16" (.187") smooth aluminum plate. The shelf shall have a minimum 2" front lip for added strength and reinforcement and to accommodate optional plastic interlocking compartment tile systems.

The shelf shall be capable of holding 100 lbs.

### **126. Adjustable Tracks**

Tracks shall be provided in L1 lower, L3 lower, R3 lower for use with adjustable shelves and/or trays in deep non-transverse compartments. The tracks shall be vertically mounted and attached to the side and/or rear walls of the compartments.

## **TRAYS / TOOLBOARDS**

### **127. Running board Suction Tray**

A running board suction hose storage tray (approx. 35"W) shall be provided and located in the driver side running board, officer side running board.

The tray shall be recessed mounted and constructed of aluminum or comparable diamond plate (exterior) with a smooth sanded surface interior. The bottom of the tray shall have removable aluminum slats and drain holes to allow water drainage from hose stored in the tray.

### **128. Roll-Out Tray**

There shall be a floor mounted roll-out tray provided in compartment L1, L3, R1, R3, B1.

The roll-out tray shall be constructed of smooth aluminum plate with a sanded finish and welded corners for increased strength and rigidity. The tray shall be sized in width and depth as applicable.

For greater tray accessibility, the drawer slides shall feature one hundred percent extension. The tray shall utilize a pneumatic shock to secure the tray in the open or closed position.

The tray shall have a total capacity of 500 lbs.

### **129. Roll-Out Tray**

There shall be an adjustable roll-out tray provided in compartment L1, L3, R3.

The roll-out tray shall be constructed of smooth aluminum with welded corners for strength and rigidity. The tray shall be sized in width and depth as applicable.

For greater tray accessibility, the drawer slides shall feature one hundred percent extension. The tray shall utilize a gas shock to hold the tray in an open or closed position.

The tray shall have a total capacity of 500 lbs.

## **COVERS**

### **130. Hose Bed Cover**

A cover constructed of 18 oz. PVC vinyl coated polyester shall be installed over the apparatus hose bed. The base fabric shall be 1000 x 1300 Denier Polyester with a fabric count of 20 x 20 square inch.

The front edge of the cover shall be mechanically attached to the body. The sides of the cover shall be held in place with heavy duty Velcro strips running the length of the hose bed and manual snaps or grommets to attach to the truck. The rear of the cover shall have an integral flap that extends down to cover the rear of the hose bed. This flap shall be secured in place with heavy duty nylon straps to comply with the latest edition of NFPA 1901.

### **131. Speedlay Cover**

The speedlay module shall have an aluminum diamond plate cover. The cover shall be fixed along the rear of module and hinged over the speedlays with a hold-open that shall not interfere with hose deployment or loading.

### **132. Speedlay Covers - Sides**

A pair of covers constructed of 18 oz. PVC vinyl coated polyester shall be installed over the side openings of the apparatus speedlay. The base fabric shall be 1000 x 1300 Denier Polyester with a fabric count of 20 x 20 square inch.

The covers shall be secured in place to comply with the latest edition of NFPA 1901.

### **133. Running board Tray Securing Strap**

A heavy duty black nylon strap with an aluminum quick-release buckle shall be provided for the running board hose tray(s). The strap shall be attached to the inboard side of the tray as low as practical to allow cinching of strap for securing tray contents and shall not reduce the overall tray capacity.

Location: driver side running board, officer side running board.

## **PUMP MODULE**

### **134. Lower Pump Module**

Lower pump module shall be provided and located forward of the body. The pump module shall be constructed entirely of aluminum or comparable and interlocking aluminum plates. The pump module design and mounting shall be separate from the body to allow the pump module

and body to move independently of each other in order to reduce stress from frame twisting and vibration. The exterior surface of the pump module shall have a sanded finish.

### **135. Pump Module Running Boards**

The pump module shall include a running board on each side of the pump module. The running boards shall be in accordance with NFPA in both step height and stepping surface. The maximum step height to each running board shall not exceed 24". The running boards shall be formed from aluminum tread plate. Each running board shall include a multi-directional, aggressive gripping surface incorporated into the tread plate. The surface shall extend vertically from the diamond plate sheet a minimum. Gripping surfaces shall be circular in design, a minimum of 1" diameter and on centers not to exceed 4". Each running board shall be bolted on to the pump module and be easily removable for replacement in the case of damage.

### **136. Upper Pump Module**

The upper pump module with a forward area for the top mounted pump control panel, backboard storage and dunnage pan shall be provided. The upper pump module shall be constructed entirely of aluminum extrusions and interlocking aluminum plates. The upper pump module design and mounting shall allow the upper area of the pump module to be reconfigured to meet possible future needs or growth of the department. The exterior surface of the upper pump module shall have a sanded finish.

### **137. Top Mounted Pump Control Area**

The forward upper pump module shall have an area for mounting all the necessary components for a top mount controlled pump application.

### **138. Backboard Storage**

The module design shall include backboard storage area forward of the dunnage pan. The storage area shall have an opening of approximately 20" high x 5" wide. The backboards shall be secured with aluminum tread plate vertically hinged doors on each end of the compartment.

### **139. Dunnage Pan**

A dunnage pan constructed of aluminum tread plate or equivalent shall be located rearward of the dunnage pan. The dunnage pan shall be sized to maximize available storage space.

### **140. Pump Module Width**

Pump Module shall be sized appropriately for the pump.

### **141. Speedlay Module**

An aluminum or equivalent speedlay module with an area for a triple speedlay shall be provided and located to the forward area of the pump module. The speedlay module shall be constructed entirely of aluminum. The speedlay module design and mounting shall be separate from the pump module and the body to allow each to move independently of each other in order to reduce stress from frame twisting and vibration. The exterior surface of the speedlay module shall have a sanded finish.

#### **142. Speedlay Preconnect Storage**

The module design shall include an area for three (3) stacked speedlays (side by side). The floor of the module shall be slotted to prevent the accumulation of water and allow for ventilation of wet hose. Two (2) smooth aluminum plate adjustable divider with a sanded finish shall be provided to separate the speedlays.

#### **143. Speedlay Compartments**

The area directly below the speedlay shall include two (2) compartments, one (1) each side. Each compartment shall provide approximately 1.4 cu. ft. of storage space. The compartments shall include vertically-hinged aluminum tread plate doors with push-button latches. A switch wired to the door ajar indicator light in the cab shall be provided interlocked with the parking brake per NFPA.

#### **144. Speedlay Module Running Boards**

The speedlay module shall include a running board on each side of the module. The running boards shall be in accordance with NFPA in both step height and stepping surface. The maximum step height to each running board shall not exceed 24". The running boards shall be formed from aluminum tread plate. Each running board shall include a multi-directional, aggressive gripping surface incorporated into the tread plate. The surface shall extend vertically from the diamond plate sheet with the gripping surfaces shall be circular in design, a minimum of 1" diameter and on centers not to exceed 4". Each running board shall be bolted on to the pump module and be easily removable for replacement in the case of damage.

#### **145. Speedlay Module Location**

Speedlay module shall be located forward of crosswalk module.

#### **146. Crosswalk Module**

An aluminum extruded or comparable crosswalk module shall be provided and located forward of the pump module. The crosswalk module shall be constructed entirely of aluminum. The crosswalk module design and mounting shall be separate from the pump module and the body to allow each to move independently of each other in order to reduce stress from frame twisting and vibration. The exterior surface of the crosswalk module shall have a sanded finish.

The crosswalk walkway shall be in accordance with NFPA in both step height and stepping surface. The crosswalk shall include two (2) crosswalk walkway access dual lighted LED folding steps, two (2) 36" handrails, one (1) on each side mounted vertically on the forward extrusion of the pump module. The crosswalk walkway shall be formed from aluminum tread plate and shall include a multi-directional, aggressive gripping surface incorporated into the

tread plate. The surface shall extend vertically from the diamond plate sheet. Gripping surfaces shall be circular in design, a minimum of 1" diameter and on centers not to exceed 4". The crosswalk walkway shall be bolted on to the module and be easily removable for replacement in the case of damage.

#### **147. Crosswalk Walkway Compartments**

The area directly below the crosswalk walkway shall include two (2) compartments, one (1) each side. Each compartment shall provide approximately 1.4 cu. ft. of storage space. The compartments shall include spring loaded, vertically-hinged aluminum tread plate doors with push-button latches. A switch wired to the door ajar indicator light in the cab shall be provided interlocked with the parking brake per NFPA.

#### **148. Crosswalk Module Running Boards**

The crosswalk module shall include a running board on each side of the pump module. The running boards shall be in accordance with NFPA in both step height and stepping surface. The maximum step height to each running board shall not exceed 24". The running boards shall be formed from aluminum tread plate. Each running board shall include a multi-directional, aggressive gripping surface incorporated into the tread plate. The surface shall extend vertically from the diamond plate sheet a minimum of 1/8" (.125"). Gripping surfaces shall be circular in design, a minimum of 1" diameter and on centers not to exceed 4". Each running board shall be bolted on to the module and be easily removable for replacement in the case of damage.

### **PUMP PANELS**

#### **149. Top Mount Pump Panels**

The top mount gauge panel, driver and officer side pump panels shall be constructed of 14 gauge stainless steel.

The top mount gauge panel shall be able to lift forward for access to panel mounted electrical connections.

The driver and officer panels shall have the ability to be removed from the module for easier access and for maintenance in the pump area.

When the pump is in gear there shall be a minimum of three (3) lights that come on when the pump is in gear over the panel. The lights that shall come on will be the two on the outside and one in the middle.

#### **150. Pump Access Doors**

The driver and officer side pump module shall include an upper horizontally hinged pump access door.

The doors shall be constructed of aluminum tread plate. The compartment doors shall be securely attached with a full-length stainless steel piano type hinge with 1/4” pins. The hinges shall be “staked” on every other knuckle to prevent the pins from sliding. The doors shall include two (2) push button style latches to secure the doors in the closed position and two (2) hold open devices to hold the doors in the open position.

## **MISC PUMP PANEL OPTIONS**

### **151. Pump Panel Tags**

Color coded pump panel labels shall be supplied to be in accordance with NFPA 1901 compliance.

## **PUMP MODULE OPTIONS**

### **152. Pump Compartment Heaters**

Two (2) 25,000 Btu heaters shall be installed in the lower pump compartment area. The heaters shall be connected to the chassis engine coolant system and shall include 12 volt blowers. The heaters shall be controlled at the pump operator’s panel by a switch or by cold temperature sensors.

### **153. Heat Pan**

The pump compartment shall have a heat pan installed under the pump area. The heat pan shall be constructed of smooth aluminum plate or comparable and shall be easily removable for fair weather operations.

The heat pan shall be four (4) sided with two (2) removable bottoms. The bottoms shall provide access to the lower area of the pump/pump compartment. The bottoms shall include butterfly latches to secure them in the closed position.

### **154. Flex Joint**

The area between the pump modules and body shall include a rubber flex joint.

### **155. Module Logos**

If module logos are going to be installed on either side of the pump panel please give a detailed list of where they will be installed.

## **156. Air Horn Switch**

A heavy duty weatherproof push-button switch shall be installed at the pump operator's panel to operate the air horns.

The switch shall be labeled "Evacuation Alert".

Location: top mount control panel.

## **WATER TANK**

### **157. 1000 Gallon Water Tank**

A 1000 gallon (US) "R" booster tank shall be supplied. The booster tank shall be of a pinned baffle design. The booster tank shall be completely removable without disturbing or dismantling the apparatus body structure.

The booster tank top, sides, and bottom shall be constructed of UV-stabilized copolymer polypropylene. The copolymer polypropylene tank material shall be welded together utilizing thermoplastic welding technology. The copolymer polypropylene material shall be used for its high strength and corrosion resistance for a prolonged tank life.

The booster tank shall have a fill tower with a rearward hinged lid. The fill tower shall be located in the forward area of the tank and shall assist with tank ventilation. The fill tower shall include a removable 1/4" (0.25") thick polypropylene screen.

The booster tank shall have four (4) tank plumbing openings. Two (2) for a tank-to-pump suction line with an anti-swirl plate, (one in the front of the tank and one in the rear of the tank) and one (1) for a tank fill line. One for direct tank fill line to be installed in either in the rear of the truck or the side. A 3" cleanout plug shall be provided at the bottom of the tank sump.

The booster tank shall include longitudinal and latitudinal baffles. The baffles shall be interlocking and thermo welded to the shell of the tank to minimize water surge during travel and provide enhanced road handling stability. The baffle design shall allow water flow in accordance with NFPA during tank filling or pump operations.

A 2.5` length of black flex hose shall be installed to the bottom of the tank. This shall direct the draining of overflow water past the rear axle and fuel tank, thus reducing the possibility of freeze-up of these components in cold environments. This drain configuration shall also assure that rear axle tire traction shall not be affected when moving forward.

The booster tank shall undergo extensive testing prior to installation in the truck. The testing shall include an electronic spark and tank fill test after both the internal and external tank shell welds are completed.

A lifetime manufacture's limited warranty shall be included.

Tank capacity is 1000 US gallon.

## **TANK PLUMBING**

### **158. Tank Fill 2 Akron Valve**

One (1) 2” pump-to-tank fill line having a 2” manually operated full flow valve. The valve control shall be located at the pump operator’s panel and shall visually indicate the position of the valve at all times. The fill line shall be controlled using a chrome handle with an integral tag.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position with water flowing through it.

The valve shall be of unique Akron swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

### **159. Tank To Pump**

One (1) manually operated 3” Akron valve shall be installed between the pump suction and the booster tank in the front of the tank, 4” piping, with flex hose and stainless steel hose clamps connected to the tank. The valve control shall be located at the pump operator’s panel and shall visually indicate the position of the valve at all times.

One (1) manually operated 2” Akron valve shall be installed in the area of the rear of the tank, so that if parked on hill either facing up or down hill can utilize all of the tank water.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position and water is flowing through it.

The valve shall be of the unique Akron swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

### **160. Tank Fill Water-3**

One (1) 3” water tank fill connection shall be provided and mounted in the rear or side of the truck. The connection shall include an inlet strainer, and have a 4 inch Storz fitting with a cover that has a chain or cable. A 3” stainless steel pipe and/or high pressure flexible hose will connect to the water tank.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss. One 3" check valve shall be installed between the fill connection port and the tank to prevent water from flowing out of the tank after filling and disconnecting the hose.

## **FOAM TANK**

### **161. 30 Gallon Foam Tank**

A 30 gallon (U.S.) foam cell for class A (or COLD FIRE) foam shall be supplied. The foam cell shall be integral to the water tank.

The integral tank top, sides, and bottom shall be constructed of UV-stabilized copolymer polypropylene. The copolymer polypropylene tank material shall be welded together utilizing thermoplastic welding technology. A clean hot air temperature controlled process, shall ensure that each weld reaches its plasticized state without cold or hot spots. The copolymer polypropylene material shall be used for its high strength and corrosion resistance for a prolonged tank life.

The foam tank shall have one (1) fill tower with a hinged lid. The foam fill tower shall include a stainless steel butterfly latch to secure the lid in the closed position and a pressure/vacuum vent mounted in the lid. The fill tower shall be located in the forward area of the tank. The fill tower shall include a removable 1/4” (0.25”) thick polypropylene screen.

The foam tank shall undergo extensive testing prior to installation in the truck. The testing shall include an electronic spark and tank fill test after both the internal and external tank shell welds are completed.

A lifetime manufacture’s limited warranty shall be included. As this vehicle is intended to perform the function of a pumper with foam capability, foam tank capacity of less than 30 gallons shall not be acceptable.

## **LADDER STORAGE / RACKS**

### **162. Ladder Brand**

The ladder brand capable of being carried on the unit shall be Alco-Lite.

### **163. Ladders**

The length of ladders capable of being stored shall be the following: 24' 2-Section and 14' roof ladder.

## **164. Storage Tunnel Contents**

Storage tunnel capable of holding (2) 6" x 10' hard suction hoses (individually vertically stacked) in Driver, (1) 2-Section ladder, (1) Roof ladder, (1) Attic ladder, (2) pike poles in Officer.

## **HANDRAILS / STEPS**

### **165. Hose bed Folding Steps**

Dual lighted LED folding steps shall be positioned to the driver side rear of the body. The steps shall be NFPA compliant for access to the hose bed storage area and in step height and surface area. The steps shall be staggered stepped as applicable with tailboard depth, not applicable with recessed step mounting.

Dual lighted LED folding step with LED lights integral to the step on the top to provide NFPA requirements of 2 FC on the stepping surface. Each step shall also have a LED light integral to the bottom of the step to meet NFPA requirements of stepping surfaces up to 18" below the step.

The folding step shall sustain a minimum static load of 500 lbs. The folding step shall also meet NFPA slip resistance qualifications.

One (1) handrail shall be installed (as applicable) in compliance with current NFPA. The handrail shall be constructed of aluminum tube, with an integral ribbed surface to assure a good grip for personnel safety, mounted between chrome stanchions.

## **MISC BODY OPTIONS**

### **166. Rear Mud Flaps**

The rear tires shall have a set of black mud flaps mounted behind the rear chassis wheels with logo.

### **167. Body Height and Mainframe Construction**

The body mainframe shall be entirely constructed of aluminum or comparable material.

The frame sill extrusions shall be shaped to contour with the chassis frame rails and shall be protected from contact with the chassis frame rails by fiber-reinforced rubber strips to prevent wear and galvanic corrosion caused when dissimilar metals come in contact.

### **168. Body Mounting System**

The main body shall be attached to the chassis frame rails with grade 8 U-bolts. The rear of the body shall be spring mounted to allow for chassis flex. This body mounting system shall be used to allow easy removal of the body for major repair or disassembly.

## **169. Water Tank Mounting System**

The body design shall allow the booster tank to be completely removable without disturbing or dismounting the apparatus body structure. The water tank shall rest on top of a frame assembly covered with rubber shock pads and corner braces formed from angled plate to support the tank. The booster tank mounting system shall utilize a floating design to reduce stress from road travel and vibration. To maintain low vehicle center of gravity the water tank bottom shall be mounted within 5" of the frame rail top.

## **170. Hose bed Side Assembly**

The hose bed side assemblies shall be made of slotted aluminum extrusion and smooth plate.

The exterior hose bed side surface shall be completely sanded and deburred to assure a smooth finish and painted job color. The interior hose bed side surface shall be completely sanded and deburred to assure a smooth sanded finish.

## **171. Hose Bed Capacity**

The hose bed shall have the capacity to store the following hose from the driver side to the officer side.

- 4" 2000'
- 2 ½" 200'
- 1 ¾ 400'

## **172. Hose bed**

The area above the booster tank shall have a hose storage area provided. The hose bed shall be constructed entirely from maintenance-free, 3/4" deep x 7.5" wide, extruded aluminum slats that shall be pop-riveted into a one-piece grid system. Each slat shall have all sharp edges removed and have an anodized ribbed top surface that shall prevent the accumulation of water and allow for ventilation of wet hose.

The hose bed shall include an open area for the fill tower(s). The hose bed design shall incorporate adjustable tracks in the forward area rearward of the fill tower(s) and the rearward area of the hose bed for the installation of an adjustable divider(s). The adjustable tracks shall hold an adjustable divider(s) mounting nut straight, so only a Philips head screwdriver is required to adjust a divider(s) from side to side.

The hose bed shall be easily removable to allow access to the booster tank below.

## **173. Hose Bed Divider [Qty: 3]**

There shall be a hose bed divider provided the full fore-aft length of the hose bed.

The hose bed divider shall be constructed of smooth aluminum plate with an extruded aluminum base welded to the bottom. The rear end of the divider shall have a 3" radius corner to protect

personnel. The divider shall be natural finish aluminum for long-lasting appearance and shall be sanded and deburred to prevent damage to the hose.

The divider shall be adjustable from side to side in the hose bed to accommodate varying hose loads.

#### **174. Hose Bed Divider Hand Hold**

There shall be a hand hole cut-out on the trailing edge of each hose bed divider. The cut-out is specifically sized for use in adjusting of the hose bed divider.

#### **175. Divider**

Long hose bed divider(s) shall be held short to allow for adjustability of the divider(s) with hose bed preconnect(s).

#### **176. Overall Height Restriction**

The apparatus shall meet all industry standards for overall height restrictions.

#### **177. Overall Length Restriction**

The unit has no overall length restrictions.

#### **178. Fuel Fill**

A recessed fuel fill shall be provided at the driver side rear wheel well area.

#### **179. Body Wheel Well**

The body wheel well frame shall be constructed from aluminum or comparable with a slot the full length to permit an internal fit of aluminum tread plate. The wheel well trim shall be constructed from formed aluminum or comparable. The wheel well liners shall be constructed of a composite material. The liners shall be bolt-on and shall provide a maintenance-free and damage-resistant surface.

#### **180. Rub rail**

The pump area module(s) and body shall have rub rails mounted along the sides and at the rear.

The rub rail shall be C-channel in design. The rub rail shall extend beyond the body width to protect compartment doors and the body side. The rub rail depth shall allow marker and/or warning lights to be recessed inside for protection.

The rub rail shall be mounted off the pump module and body with nylon spacers. The ends of each section shall be provided with a finished rounded corner piece.

## **SCBA BOTTLE STORAGE**

## **181. Wheel Well SCBA Storage**

The body wheel well area shall store up to seven (7) SCBA bottles- four (4) on the officer side and three (3) on the driver side. The bottles shall be secured in each storage area by a vertically hinged door which shall be secured in the closed position by a push button latch. The doors shall match the wheel well area material and finish.

## **PUMPS**

### **182. Fire Pump System**

The pump shall be a midship-mounted Hale QMAX single stage centrifugal pump. The pump shall be mounted on the chassis frame rails and shall be split-shaft driven.

The entire pump body and related parts shall be of fine grain alloy cast iron, with a minimum tensile strength of 30,000 psi (207 MPa). All metal moving parts in contact with water shall be of high quality bronze or stainless steel. Pump body shall be horizontally split in two sections, for easy removal of impeller assembly including wear rings and bearings from beneath the pump without disturbing pump mounting or piping.

The pump impeller shall be hard, fine grain bronze of the mixed flow design and shall be individually ground and hand balanced. Impeller clearance rings shall be bronze, easily renewable without replacing impeller or pump volute body, and of wrap-around double labyrinth design for maximum efficiency.

The pump shaft shall be heat-treated, corrosion-resistant stainless steel and shall be rigidly supported by three (3) bearings for minimum deflection. 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 shall be splash-lubricated. Pump shaft must be sealed with double-lip oil seal to keep road dirt and water out of the gearbox.

Two (2) 6" diameter suction ports with 6" NST male threads and removable screens shall be provided, one each side. The ports shall be mounted one (1) on each side of the midship pump and shall extend through the side pump panels. Inlets shall come equipped with long handle chrome caps.

### **183. Discharge Manifold**

The pump system shall utilize a stainless steel discharge manifold system that allows a direct flow of water to discharge valves. The manifold and fabricated piping systems shall be constructed of a minimum of Schedule 10 stainless steel to reduce corrosion.

The apparatus manufacturer shall provide a full 10 year stainless steel plumbing components warranty. This warranty shall cover defects in materials or workmanship of apparatus manufacturer designed foam/water plumbing system stainless steel components for 10 years. A copy of the warranty document shall be provided with the proposal.

### **184. Priming System**

The electrically-driven priming pump shall be a positive displacement vane type. One (1) priming control, located at the pump operator's position, shall open the priming valve and start the priming motor. The primer shall be oil-less type. The priming valve shall be electronically interlocked to the "Park Brake" circuit to allow priming of the pump before the pump is placed in gear.

### **185. Pump Shift**

The pump shift shall be pneumatically-controlled using a power shifting cylinder.

The power shift control valve shall be mounted in the cab and be labeled "PUMP SHIFT". The apparatus transmission shift control shall be furnished with a positive lever, preventing accidental shifting of the chassis transmission.

A green indicator light shall be located in the cab and be labeled "PUMP ENGAGED". The light shall not activate until the pump shift has completed its full travel into pump engagement position.

A second green indicator light shall be located in the cab and be labeled "OK TO PUMP". This light shall be energized when both the pump shift has been completed and the chassis automatic transmission has obtained converter lock-up (4th gear lock-up).

### **186. Systems**

Two (2) test plugs shall be pump panel mounted for third party testing of vacuum and pressures of the pump.

A master drain valve shall be installed and operated from the pump operator's panel. The master pump drain assembly shall consist of a Class 1 bronze master drain with a rubber disc seal and turning handle.

The manual master drain valve shall have six (6) individually-sealed ports that allow quick and simultaneous draining of multiple intake and discharge lines. It shall be constructed of corrosion-resistant material and be capable of operating at a pressure of up to 600 psi.

The master drain shall provide independent ports for low point drainage of the fire pump and auxiliary devices.

### **187. Gearbox Cooler**

A gearbox cooler shall be provided to maintain safe operating temperatures during prolonged pumping operations for pump rating 1500 GPM and over.

### **188. Auxiliary Engine Cooler**

An engine cooler used to lower engine water temperature during prolonged pumping operations and controlled at the pump operator's panel shall be provided.

The engine cooler shall be installed in the engine coolant system in such a manner as to allow cool pump water to circulate around engine water, thus forming a true heat exchanger action.

Cooler inlet and outlet shall be continuous, preventing intermixing of engine coolant and pump water.

**189. Pump Rating**

The fire pump shall be rated at 1500 GPM.

**190. Fire Pump Extended 3 Year Warranty**

Hale Pump Pro-Tech extended 3 Year warranty in addition to the standard 2 year warranty.

Covers labor for years three, four and five above the standard warranty.

**PUMP CERTIFICATION**

**191. Pump Certification**

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 a 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 deliver the percentage of rated capacities at pressures indicated below:

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

A test plate, installed at the pump panel, shall provide the rated discharges and pressures together with the speed of the engine as determined by the certification test, and the no-load governed speed of the engine.

A Certificate of Inspection certifying performance of the pump and all related components shall be provided at time of delivery. Additional certification documents shall include, but not limited to, Certificate of Hydrostatic Test, Electrical System Performance Test, Manufacturer's Record of Pumper Construction, and Certificate of Pump Performance from the pump manufacturer.

**PUMP OPTIONS**

**192. Steamers, Flush+1"**

The pump 6" steamer Intake(s) shall be mounted approximately 1" from the pump panel to back of cap when installed. The "Flush+1" dimension can vary + or - 1-1/4" or as practicable depending on the pump module width and options selected.

Location: driver's side, officer's side

### **193. Inlet Valve**

A Hale Master Intake Valve (MIV-E) shall be provided for the specified intake. The large diameter inlet valve shall be capable of achieving an NFPA test rating of 1500 GPM through a single 6" suction hose.

The inlet valve shall be operated by a 12 VDC electric motor with a remote switch provided at the pump operator's position. The 12 VDC motor shall be provided with an automatic resetting, thermally-compensated over current protection circuit breaker to protect the 12 VDC motor and apparatus electrical system. The gear actuator on the valve will cycle from full closed to full open in not less than three (3) seconds. A hand controlled pump panel mounted manual override (knob style) shall be provided.

An indicator light panel shall be located at the pump operator's position to show valve open, closed, or traversing from open to closed.

A built-in adjustable pressure relief valve shall be provided. The pressure relief valve shall be factory set to 125 psi. The pressure relief valve shall provide overpressure protection for the suction hose even when the intake valve is closed.

A 3/4" air bleeder valve shall be provided and controlled at the pump operator's position.

A 1/4" water bleeder shall be supplied and controlled at the pump operator's position.

Location: 5 in. front intake.

### **194. Pump Seal Packing**

The pump shaft shall have only one (1) packing gland located on the inlet side of the pump. It shall be of split design for ease of repacking. The packing gland shall be of a design to exert uniform pressure on packing and to prevent cocking and uneven packing load when tightened. The packing rings shall be permanently lubricated, graphite composition and have sacrificial zinc foil separators to protect the pump shaft from galvanic corrosion.

The packing shall be easily adjusted by hand with rod or screw driver with no special tools or wrenches required.

### **195. Master Drain, Air Operated**

An air operated master drain valve shall be installed and operated from the pump operator's panel. The master pump drain assembly shall consist of a Class 1 bronze master drain with a rubber disc seal and air switch.

The air master drain valve shall have six (6) individually-sealed ports that allow quick and simultaneous draining of multiple intake and discharge lines. It shall be constructed of corrosion-resistant material and be capable of operating at a pressure of up to 600 PSI.

The master drain shall provide independent ports for low point drainage of the fire pump and auxiliary devices.

### **196. Additional Hale Primer**

An additional primer valve shall be provided and installed on the 5 in. front intake and controlled at the pump operator's panel.

One (1) priming control shall open the priming valve in conjunction with the priming valve that comes with the pump and start the priming motor. The priming valve shall be electronically interlocked to the "Park Brake" circuit to allow priming of the pump before the pump is placed in gear.

If plumb to front or rear intakes the connection shall be at the highest point of the piping.

## **INTAKES**

### **197. Intake 2.5 Top Mount Control Akron Valve**

One (1) 2-1/2" suction inlet with a manually operated 2-1/2" Akron valve shall be provided on the driver side pump panel.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position and water is flowing through it.

The valve shall be of the unique Akron swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

The outlet of the valve shall be connected to the suction side of the pump with the valve body located behind the pump panel. The valve shall come equipped with a brass inlet strainer, 2-1/2" NST female chrome inlet swivel and shall be equipped with a chrome plated, rocker lug plug with a retainer device.

The valve shall be controlled by a vertically mounted quarter turn locking handle located on the top mounted pump operator's panel and shall visibly indicate the position of the valve at all times.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance, and decreased friction loss.

A 3/4" bleeder valve assembly will be installed on the side pump panel.

### **198. Front Intake 5 No Valve**

A 5" stainless steel pipe shall extend from the right suction side of the pump to the front of the apparatus. All fabricated piping used in the front suction shall be constructed of a minimum of Schedule 10 stainless steel pipe to reduce corrosion of the lines. 3/4" valve(s) shall be provided to allow water to be drained.

The inlet valve shall be operated by a 12 VDC electric motor with a remote switch provided at the pump operator's position. The 12 VDC motor shall be provided with an automatic resetting, thermally-compensated over current protection circuit breaker to protect the 12 VDC motor and apparatus electrical system. The gear actuator on the valve will cycle from full closed to full open in not less than three (3) seconds. A hand controlled pump panel mounted manual override (knob style) shall be provided.

An indicator light panel shall be located at the pump operator's position to show valve open, closed, or traversing from open to close.

## **INTAKE OPTIONS**

### **199. Intake Relief Valve**

The pump shall be equipped with an Akron style 59 cast brass, variable-pressure-setting relief valve on the pump suction side. It shall be designed to operate at a maximum inlet pressure of 250 PSI. The relief valve shall be normally closed and shall be set to begin opening at 125 PSI in order to limit intake pressures in the pumping system. When the relief valve opens, the overflow water shall be directed through a plumbed outlet to discharge below the body in an area visible to the pump operator. The overflow outlet shall terminate with a male 2-1/2" NST threaded fitting to allow the overflow water to be directed away from the vehicle with a short hose (supplied by the fire department) during freezing weather or under other conditions where an accumulation of water around the apparatus might be hazardous.

### **200. Front Intake Swivel 6**

A heavy duty 6" 90 degree cast brass elbow designed and constructed specifically for fire/emergency vehicle usage shall serve as the auxiliary front suction inlet. The elbow, also referred to as the "swivel", shall be attached to the front suction piping. This component shall have the following features:

- 1) The ability to rotate 180 degrees.
- 2) A rugged twist-lock mechanism to hold the elbow in place at the desired position.
- 3) A double-ball race with bronze balls.
- 4) A 5" NPT free swivel female inlet.
- 5) A 6" NHT male outlet with strainer.
- 6) Cast brass with polished chrome finish.

The elbow/swivel shall be mounted so that it extends above the extended front bumper.

## **DISCHARGES AND PRECONNECTS**

### **201. 1.5 Akron Valve**

One (1) 1-1/2" preconnect outlet with a manually operated Akron valve shall be supplied to the extended front bumper. The preconnect shall consist of a 2" heavy duty hose coming from the pump discharge manifold to a 2" FNPT x 1-1/2" MNST mechanical swivel hose connection to permit the use of the hose from either side of the apparatus.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position with water flowing through it.

The valve shall be of the unique Akron swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

An air blow-out valve shall be installed between the chassis air reservoir and the front jump line. The control shall be installed on the pump operator's panel.

The discharge shall be supplied with a Class 1 automatic 3/4" drain valve assembly. The automatic drain shall have an all-brass body with stainless steel check assembly. The drain shall normally be open and automatically close when the pressure is greater than 6 psi.

The valve control shall be located at the pump operator panel and shall visually indicate the position of the valve at all times.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

### **202. Right Front 3 Hose bed Akron Valve**

The preconnect outlet shall consist of one (1) 3" stainless steel pipe coming from the pump discharge manifold to a 3" preconnect with a 3" male NST adapter discharging to the front lower right of the apparatus hose bed.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position with water flowing through it.

The valve shall be of the unique Akron Swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

The valve control shall be located at the pump operator's panel and shall visually indicate the position of the valve at all times.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

The discharge shall be equipped with a device that shall not allow the valve to open or close in less than three (3) seconds.

### **203. 3" Discharge Akron Valve**

One (1) 3" deck gun discharge outlet with a manually operated Akron valve and 3" stainless steel pipe shall be provided above the pump compartment.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position with water flowing through it.

The valve shall be of the unique Akron swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

The valve shall be equipped with a device that limits the opening and closing speeds to comply with the current edition of NFPA 1901.

The valve control shall be located at the pump operator's panel and shall visually indicate the position of the valve at all times.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

### **204. 2 Left Front 1.5 Hose bed Preconnect Akron Valve**

The preconnect shall consist of one (2) 2" heavy-duty hose from the pump discharge manifold to a 2" preconnect with 1.5" adapter at the front lower left of the apparatus hose bed. The preconnect's shall include a manually operated Akron valve. The discharge shall include a 1/4" NPT valve for use as a bleeder/gauge drain.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position with water flowing through it.

The valves shall be of the unique Akron Swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

The valves control shall be located at the pump operator's panel and shall visually indicate the position of the valve at all times.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

### **205. Swivel Elbow, Polished Stainless Steel**

There shall be a polished stainless steel swivel elbow provided for the front bumper discharge located on top of the bumper driver's side of center tray.

### **206. Speedlay Triple 1.5/2.5 Top Mount Akron Valve**

One (1) triple speedlay discharge shall be provided. The first two (2) speedlay sections shall include one (1) 2" brass swivel with a 1-1/2" NST male hose connection each to permit the use of the hose from either side of the apparatus. One (1) third speedlay section shall include one (1) 2-1/2" brass swivel with a 2-1/2" NST male hose connection to permit the use of the hose from either side of the apparatus.

The first two (2) speedlays shall consist of a 2" heavy-duty hose from the pump discharge manifold to the 2" swivel. The discharges shall include a 2" manually-operated Akron valve. The third speedlay shall consist of one (1) 2-1/2" heavy-duty hose from the pump discharge manifold to the 2-1/2" swivel. The third discharge shall include a 2-1/2" manually-operated Akron valve.

The valves shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valves shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position with water flowing through it.

The valves shall be of the unique Akron Swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

The valve controls shall be located at the pump operator's panel and shall visually indicate the position of the valve at all times.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

Each discharge shall include a bleeder valve assembly. The bleeder valve shall be installed to drain water from the gauge pressure line to prevent freezing of the line. The drain shall be controlled with a valve on the pump panel.

### **207. Left Panel 2.5 Discharge Akron Valve**

One (1) 2-1/2" discharge outlet with a manually operated Akron valve shall be provided at the left hand side pump panel.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position with water flowing through it.

The valve shall be of the unique Akron Swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

The valve control shall be located at the pump operator panel and shall visually indicate the position of the valve at all times.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

Location: left side discharge 1, left side discharge 2

### **208. Right Panel 2.5 Discharge Akron Valve**

One (1) 2-1/2" discharge outlet with a manually operated Akron valve shall be provided at the right side pump panel.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position with water flowing through it.

The valve shall be of the unique Akron Swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

The valve control shall be located at the pump operator panel and shall visually indicate the position of the valve at all times.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

Location: right side discharge 2

### **209. Right Panel 3 Discharge Akron Valve**

One (1) 3" discharge outlet with a manually operated Akron valve shall be provided at the right side pump panel.

The discharge shall be equipped with a device that shall not allow the valve to open or close in less than three (3) seconds.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position with water flowing through it.

The valve shall be of the unique Akron Swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

The valve control shall be located at the pump operator panel and shall visually indicate the position of the valve at all times.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

Location: right side discharge 1

### **210. Deck Gun Location**

Deck gun piping shall be positioned centered in deck gun channel. This location shall allow for optimal operation of a deck gun monitor once installed.

## **DISCHARGE OPTIONS**

### **211. Bleeder Drain Valve**

The specified discharge shall be supplied with a 3/4" bleeder valve assembly. The bleeder valve shall be installed to drain water from the gauge pressure line to prevent freezing of the line. The drain shall be controlled with a quarter-turn valve on the pump panel.

Plumbed to: front bumper discharge, deck gun, driver's side hose bed preconnect, officer's side hose bed preconnect, speedlay preconnect, left discharge, right discharge.

### **212. Top Mount Control Levers**

Top mount controls handles for tank supply, tank fill, all top mount controlled intakes, and all discharges shall be lever style controls. The valve control levers shall be a locking chrome top mount control handle located at the pump operator's panel and shall visibly indicate the position of the valve at all times. The control levers shall be located directly adjacent to one another and shall be mounted in line so they are in the same position when shut off. The control levers shall be connected directly to its respective valve by a 7/8" rod to form a direct linkage control system.

## **PRESSURE GOVERNORS**

### **213. Pump Pressure Governor**

The apparatus shall be equipped with a Class 1 engine/pump pressure governor/throttle system connected directly to the Electronic Control Module (ECM) mounted on the engine. The governor shall control and monitor the pump master discharge pressure, eliminating any need

for a relief valve on the discharge side of the pump. A special preset feature shall permit a pre-determined pressure or RPM to be set and hold it against varying flow rates at independent discharge lines by modulating engine rotation speed. Control of the engine speed shall be dictated by pre-programmed software in the electronic control module. The preset shall be easily adjustable by the operator.

The Class 1 system shall be installed in place of the discharge relief valve and the pump panel mounted hand throttle.

A display/control unit shall be mounted on the pump operator's panel. The control unit shall be a self-contained, weatherproof module, approximately 4.5" W x 6" H. The display unit shall provide alpha-numeric display.

## **GAUGES- all oil filled gauges to prevent freezing**

### **214. Compound Pressure Gauge [Qty: 2]**

A Class 1 weatherproof 4-1/2" compound vacuum pressure gauge with a range of 30-0-600 shall be installed on the pump panel. The gauge shall be filled with oil solution.

### **215. GAUGE IC 10 LED TANK LEVEL WATER**

One (1) water tank level gauge shall be located at the pump operator's panel to provide a high-visibility display of the water tank level. Ten (10) high-intensity light emitting diodes (LED's) on the display module shall have a 3 dimensional lens allowing the full, 3/4, 1/2, 1/4, and refill levels to be easily distinguished at a glance within full 180 degree visibility.

The display module shall be protected from vibration and contamination with the components being encased in an encapsulated plastic housing. The long life and extreme durability of LED indicators eliminates light bulb replacement and maintenance. Color coded cover plates shall complete the assembly of the display module to the pump panel. Each display level can be set independently for maximum reliability.

The display shall provide a steady indication of fluid level despite sloshing inside of the tank when the vehicle is in motion due to an "anti-slosh" feature.

### **216. GAUGE IC 10 LED TANK LEVEL FOAM**

One (1) foam tank level gauge shall be located at the pump operator's panel to provide a high-visibility display of the foam tank level. Ten (10) high-intensity light emitting diodes (LEDs) on the display module shall have a 3 dimensional lens allowing the full, 3/4, 1/2, 1/4, and refill levels to be easily distinguished at a glance within full 180 degree visibility.

The display module shall be protected from vibration and contamination with the components being encased in an encapsulated plastic housing. The long life and extreme durability of LED indicators eliminates light bulb replacement and maintenance. Color coded cover plates shall complete the assembly of the display module to the pump panel. Each display level can be set independently for maximum reliability.

The display shall provide a steady indication of fluid level despite sloshing inside of the tank when the vehicle is in motion due to an "anti-slosh" feature.

## **217. Enfo IV System**

The apparatus shall be equipped with a Class 1 Enfo IV electronic system and engine operating information display/warning system mounted on the pump operator's panel. The gauge shall be a self-contained, weatherproof display, approximately 4.5"H x 6"W.

Features:

- Engine RPM - engine RPM shall be displayed numerically.
- System voltage display and alarm - a display shall be provided to indicate voltage and an audible alarm warning of low voltage. If the system voltage drops below 11.9 volts (12V ignition), or below 23.8 volts (24V ignition), for more than 2 seconds the audible alarm shall activate and shall cause the display to alternate between the current value and "LO" to warn the operator.
- Engine temperature display and alarm - a display shall be provided to indicate engine temperature and an audible alarm warning of high engine temperature. If the engine temperature reaches 250 degrees F or higher the audible alarm shall activate and the display shall alternate between the current temperature and "HI" to warn the operator.
- Engine oil pressure display and alarm - a display shall be provided to indicate oil pressure and an audible alarm warning of low oil pressure. If the oil pressure drops to 10 PSI or lower the audible alarm shall activate and the display shall alternate between the current pressure and "LO" to warn the operator.

The connection to the apparatus shall be achieved by the use of a Deutsch four (4) position socket connector.

## **218. Compound Pressure Gauge**

A Class 1 weatherproof 2-1/2" compound vacuum pressure gauge with a range of 30-0-600 shall be installed on the pump panel. The gauge shall be filled with an oil solution to assure visual reading to within 1% accuracy.

Gauge shall be provided for the following discharge(s): front bumper discharge, 1.5 in. speedlay preconnect, 2.5 in. speedlay preconnect, deck gun, driver's side hose bed preconnect, officer's side hose bed preconnect, left side discharge 1, left side discharge 2, right side discharge 1, right side discharge 2.

# **FOAM SYSTEMS**

## **219. Foam System**

A Hale FoamLogix 2.1A, 12 volt DC powered variable-speed electronic direct-injection foam-concentrate proportioning system with a 2.1 gpm foam concentrate pump shall be integrated into the apparatus to provide foam proportioning. The pump shall be capable of handling Class A foam concentrate or COLD FIRE only and be operated by a full-function panel mounted digital display.

The system shall operate via a paddlewheel flow sensor mounted in a 3 inch stainless steel double waterway check-valve manifold that includes a 1/2 inch chemical injection point check valve. This double check-valve assembly is required for backflow prevention and NFPA compliance. A single check valve assembly will not be permitted.

The inlet of this stainless steel manifold/double check-valve assembly will be connected to the fire pump, and the outlet connected to the foam capable discharge outlet(s) on the fire apparatus, as specified. The flow sensor/stainless steel foam manifold combination shall be capable of water or foam solution flow rates of 30 to 750 gpm.

The foam proportioning system shall be equipped with a panel mounted digital display control unit with a microprocessor that monitors total water flow and foam concentrate pump output to provide the operator preset proportional amount of foam concentrate injected on the discharge side of the fire pump. Total foam concentrate pump concentrate output shall be 2.1 gallons per minute. Proportioning rate is push-button set by the pump operator on the digital display from 0.1% to 1%, in 0.1% increments.

The digital display panel mounted electronic operator control unit shall provide concentrate injection readout in tenths of a percent while also being able to read water flow, total water flowed and total amount of foam concentrate used. The control shall flash a warning indicating low concentrate in the reservoir to the operator, and shall be able to shut off the concentrate pump to prevent damage to the pump. A bar graph on the control unit shall provide visual indication of system operating capacity and will indicate when capacity is exceeded.

Foam concentrate proportioning systems that do not have the above panel mounted digital display informational features will not be accepted.

The foam concentrate pump shall be fed concentrate by a non-metallic housing foam concentrate strainer that is equipped with a service shut-off valve.

The unit will be fed 12 volt DC power from the apparatus electrical system, and be equipped with a chassis frame ground strap, per the foam proportioner manufacturer's installation and operating instruction manual.

## **220. Foam System Certification**

The foam system performance shall be tested and certified in compliance with 2009 NFPA 1901.

## **FOAM SYSTEM OPTIONS**

### **221. Foam System Plumbing**

The specified foam system shall be plumbed to officer's side hose bed preconnect, 1.5 first speedlay, 1.5 second speedlay, driver's side front jump line.

## **ELECTRICAL SYSTEMS**

### **222. Electrical System**

The following specifications describe the low voltage electrical system on the specified fire apparatus. The electrical system shall include all panels, electrical components, switches and relays, wiring harnesses and other electrical components. The electrical equipment installed by the apparatus manufacturer shall conform to current automotive electrical system standards, the latest Federal DOT standards, and the requirements of the applicable NFPA #1901 standards.

The apparatus shall have a multiplexing system to provide diagnostic capability. The system shall have the capability of delivering multiple signals via a CAN bus, utilizing specifications set forth by SAE J1939. The electrical system shall be pre-wired for computer modem accessibility to allow service personnel to easily plug in a modem to allow remote diagnostics, troubleshooting, or program additions.

For superior system integrity, the networked system shall meet the following minimum requirement components:

- Power management center
- Load shedding power management
- Solid-state circuitry
- Switch input capability
- Responsible for lighting device activation
- Self-contained diagnostic indicators
- Power distribution module

All wiring shall be stranded copper or copper alloy conductors of a gauge rated to carry 125 percent of the maximum current for which the circuit is protected. Voltage drops in all wiring from the power source to the using device shall not exceed 10 percent. The wiring and wiring harness and insulation shall be in conformance to applicable SAE and NFPA standards. The wiring harness shall conform to SAE J-1128 with GXL temperature properties. All exposed wiring shall be run in a loom with a minimum 289 degree Fahrenheit rating. All wiring looms shall be properly supported and attached to body members. The electrical conductors shall be constructed in accordance with applicable SAE standards, except when good engineering practice requires special construction.

The wiring connections and terminations shall use a method that provides a positive mechanical and electrical connection and shall be installed in accordance with the device manufacturer's instructions. Electrical connections shall be with mechanical type fasteners and large rubber grommets where wiring passes through metal panels.

The wiring between the cab and body shall be split using Deutsche type connectors or enclosed in a terminal junction panel area. This system will permit body removal with minimal impact on the apparatus electrical system. 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.

Any electrical junction or terminal boxes shall be weather-resistant and located away from water spray conditions. In addition, the main body junction panel shall house the automatic reset breakers and relays where required.

There shall be no exposed electrical cabling, harnesses, or terminal connections located in compartments, unless they are enclosed in an electrical junction box or covered with a removable electrical panel. The wiring shall be secured in place and protected against heat,

liquid contaminants and damage. Wiring shall be uniquely identified at least every two feet (2') by color coding or permanent marking with a circuit function code and identified on a reference chart or electrical wiring schematic per requirements of applicable NFPA #1901 standards.

The electrical circuits shall be provided with low voltage over current protective devices. Such devices shall be accessible and located in required terminal connection locations or weather-resistant enclosures. The over current protection shall be suitable for electrical equipment and shall be automatic reset type and meet SAE standards. All electrical equipment, switches, relays, terminals, and connectors shall have a direct current rating of 125 percent of maximum current for which the circuit is protected. The system shall have electro-magnetic interference suppression provided as required in applicable SAE standards.

The electrical system shall include the following:

- a) Electrical terminals in weather exposed areas shall have a non-conductive grease or spray applied. A corrosion preventative compound shall be applicable to all terminal plugs located outside of the cab or body.
- b) The electrical wiring shall be harnessed or be placed in a protective loom.
- c) Heat shrink material and sealed connectors shall be used to protect exposed connections.
- d) Holes made in the roof shall be caulked with silicone. Large fender washers shall be used when fastening equipment to the underside of the cab roof.
- e) Any electrical component that is installed in an exposed area shall be mounted in a manner that will not allow moisture to accumulate in it.
- f) A coil of wire must be provided behind an electrical appliance to allow them to be pulled away from mounting area for inspection and service work.
- g) All lights that have their sockets in a weather exposed area shall have corrosion preventative compound added to the socket terminal area.

The warning lights shall be switched in the chassis cab with labeled switching in an accessible location. Individual rocker switches shall be provided only for warning lights provided over the minimum level of warning lights in either the stationary or moving modes. All electrical equipment switches shall be mounted on a switch panel mounted in the cab convenient to the operator. For easy nighttime operation, an integral indicator light shall be provided to indicate when the circuit is energized. All switches shall be appropriately identified as to their function.

A single warning light switch shall activate all required warning lights. This switch will allow the vehicle to respond to an emergency and "call for the right of way". When the parking brake is activated, a "blocking right of way" system shall be automatically activated per requirements of NFPA #1901. All "clear" warning lights shall be automatically shed on actuation of parking brake.

## 223. **NFPA Required Testing of Electrical System**

The apparatus shall be electrical tested upon completion of the vehicle and prior to delivery. The electrical testing, certifications, and test results shall be submitted with delivery documentation per requirements of NFPA #1901. The following minimum testing shall be completed by the apparatus manufacturer:

1. Reserve capacity test:

The engine shall be started and kept running until the engine and engine compartment temperatures are stabilized at normal operating temperatures and the battery system is fully charged. The engine shall be shut off and the minimum continuous electrical load shall be activated for ten (10) minutes. All electrical loads shall be turned off prior to attempting to restart the engine. The battery system shall then be capable of restarting the engine. Failure to restart the engine shall be considered a test fail.

2. Alternator performance tests at idle:

The minimum continuous electrical load shall be activated with the engine running at idle speed. The engine temperature shall be stabilized at normal operating temperature. The battery system shall be tested to detect the presence of battery discharge current. The detection of battery discharge current shall be considered a test failure.

3. Alternator performance test at full load:

The total continuous electrical load shall be activated with the engine running up to the engine 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 this test. However, an alarm sounded by excessive battery discharge, as detected by the system required in NFPA #1901 Standard, or a system voltage of less than 11.7 volts dc for a 12 volt nominal system, for more than 120 seconds, shall be considered a test failure.

4. Low voltage alarm test:

Following the completion of the above tests, the engine shall be shut off. The total continuous electrical load shall be activated and shall continue to be applied until the excessive battery discharge alarm activates. The battery voltage shall be measured at the battery terminals. With the load still applied, a reading of less than 11.7 volts dc for a 12 volt nominal system shall be considered a test failure. The battery system shall then be able to restart the engine. Failure to restart the engine shall be considered a test failure.

## 224. **NFPA Required Documentation**

The following documentation shall be provided on delivery of the apparatus:

- a. Documentation of the electrical system performance tests required above.
- b. A written load analysis, including:
  1. The nameplate rating of the alternator.
  2. The alternator rating under the conditions.
  3. Each specified component load.
  4. Individual intermittent loads.

## **225. Vehicle Data Recorder**

A vehicle data recorder system shall be provided to comply with NFPA 1901, 2009 edition. The following data shall be monitored:

- Vehicle speed MPH
- Acceleration (from speedometer) MPH/Sec.
- Deceleration (from speedometer) MPH/Sec.
- Engine speed RPM
- Engine throttle position % of full throttle
- ABS Event On/Off
- Seat occupied status Occupied Yes/No by position
- Seat belt status Buckled Yes/No by position
- Master Optical Warning Device Switch On/Off
- Time: 24 hour time
- Date: Year/Month/Day

## **226. Occupant Detection System**

There shall be a visual and audible warning system installed in the cab that indicates the occupant buckle status of all cab seating positions that are designed to be occupied during vehicle movement.

The audible warning shall activate when the vehicle's park brake is released and a seat position is not in a valid state. A valid state is defined as a seat that is unoccupied and the seat belt is unbuckled, or one that has the seat belt buckled after the seat has been occupied.

The visual warning shall consist of a graphical display that will continuously indicate the validity of each seat position.

The system shall include a display panel with LED back-lit ISO indicators for each seating position, seat sensor and safety belt latch switch for each cab seating position, audible alarm and braided wiring harness.

The display panel shall be located officer's overhead.

## **LIGHT BARS**

### **227. Light Bar**

A Federal Signal JLX6001C 60" LED Jet Stream light bar or comparable shall be installed with clear domes. The light bar shall contain nine (9) SOL 6 red LED Solaris reflectors, and six (6) SOL 3 red LED Solaris reflectors.

The light bar shall be installed in the following location: Centered on the front cab roof.

## **WARNING LIGHT PACKAGES**

## **228. Lower Level Warning**

Eight (8) Federal Signal QL64XF-R LED light heads & two (2) Federal Signal 360501-04 LED light heads all with red lens shall be provided.

The light heads shall be mounted as close to the corner points of the apparatus (as is practical) as follows:

- Two (2) QL64XF-R light heads on the front of the apparatus facing forward.
- Two (2) QL64XF-R light heads on the rear of the apparatus facing rearward.
- Two (2) QL64XF-R light heads each side of the apparatus, one (1) each side at the forward most point and one (1) centrally located to provide midship warning lighting.
- Two (2) 360501-04 LED light heads shall be mounted one (1) each side at the rearward most point (as practical).

The side facing lights shall be located at forward most position, centered in rear wheel well, and side facing at rear of body in rub rail if equipped.

All warning devices shall be surface mounted in compliance with NFPA standards.

## **229. Lower Level LED Warning Light Flash Rate**

The lower level Federal Signal Quadra Flare LED warning lights shall be set to flash at an alternating 75 quad flashes per minute.

# **WARNING LIGHTS**

## **230. Upper Rear Warning Lights**

Two (2) Federal Signal Model IVP100 Individual Vector Pods shall be supplied. Each unit shall consist of a 175 FPM rotating light. The dome colors to be driver red, officer amber, supply a red cover for this light also. Red cover not installed ship loose.

The lights shall be located rear upper body on aerial style brackets to meet Zone C upper requirements.

## **231. Preemption Emitter**

A Tomar model EMIT3 preemption emitter with chrome plated housing shall be installed.

The emitter shall be located driver's side brow.

## **232. Hazard (Door Ajar) Light**

There shall be a 2.5" red incandescent hazard light installed as specified.

The light shall be located center overhead.

# **SIRENS**

### **233. Electronic Siren**

A Federal PA300 siren model 690010 solid state electronic siren with attached noise-canceling microphone shall be installed. The unit shall be capable of driving a single high power speaker up to 200 watts to achieve a sound output level that meets Class "A" requirements.

Operating modes shall include Hi-Lo, yelp, wail, P.A., air horn and radio re-broadcast.

The siren shall be recessed mounted in the cab.

### **234. Electronic Siren Control Location**

The electronic siren control shall be located in the center overhead console offset to officer side.

### **235. Mechanical Siren**

Chrome plated and pedestal mounted Federal Q2B-P coaster siren shall be installed on top of the front bumper extension. An electric siren brake switch shall be located on the main cab switch panel.

The siren shall be located driver side front bumper.

## **SPEAKERS**

### **236. Siren Speaker**

One (1) Federal Signal model ES100 Dynamax 100 watt speaker shall be flush mounted as far forward and as low as possible on the front of the vehicle. A polished model MSFMT-EF "Electric F" grille shall be provided on the outside of the speaker to prevent road debris from entering the speaker.

Speaker dimensions shall be: 5.5 in. high x 5.9 in. wide x 2.5 in. deep. Weight = 5.5 lbs.

The speaker shall produce a minimum sound output of 120 dB at 10 feet to meet current NFPA 1901 requirements.

The speaker shall be located driver side front bumper.

## **DOT LIGHTING**

### **237. License Plate Light**

One (1) Truck-Lite model 15905 white LED license plate light mounted in a Truck-Lite model 15732 chrome plated plastic license plate housing shall be mounted at the rear of the body.

### **238. LED Marker Lights**

LED clearance/marker lights shall be installed as specified.

**Upper Cab:**

- Five (5) amber LED clearance lights on the cab roof.

**Lower Cab:**

- One (1) amber LED side turn/marker each side of cab ahead of the front door hinge.

**Upper Body:**

- One (1) red Trucklite LED clearance light each side, rear of body to the side.

**Lower Body:**

- Three (3) red Trucklite LED clearance lights centered at rear, recessed in the rubrail.
- One (1) red Trucklite LED clearance light each side at the trailing edge of the apparatus body, recessed in the rubrail.
- One (1) amber Trucklite LED clearance/auxiliary turn light each side front of body/module, recessed in the rubrail.

## **239. Tail Lights**

One (1) Federal Signal model QL64Z-BTT red L.E.D. (Light Emitting Diode) light, one (1) Federal Signal model QL64Z-ARROW amber LED light and one (1) Federal Signal QL64Z-BACKUP white LED light shall be installed in a Cast 3 housing in a vertical position each side at rear and wired with weatherproof connectors.

Light functions shall be as follows:

- L.E.D. red running light with red brake light in upper position.
- L.E.D. amber populated arrow pattern turn signal in middle position.
- L.E.D. white backup light in lower position.

A one-piece polished aluminum trim casting shall be mounted around the three (3) individual lights in a vertical position.

## **LIGHTS - COMPARTMENT, STEP & GROUND**

### **240. Compartment Light Package**

There shall be a minimum of one (1) 4" circular LED (Light Emitting Diode) mounted in each body compartment greater than 4 cu. ft. Compartments over 36" in height shall have a minimum of two (2) lights, one (1) high and one (1) low. Transverse compartments shall have a minimum of two (2) lights, located one (1) each side.

Compartment lights shall be wired to a master on/off rocker switch on the cab switch panel. Each light shall be in a resilient shock shock-absorbent mount for improved bulb life.

The wiring connection for the compartment lights shall be made with a weather-resistant plug in style connector. A single water and corrosion-resistant switch with a polycarbonate actuator and

sealed contacts shall control each compartment light. The switch shall allow the light to illuminate if the compartment door is open.

### **241. Ground Lights**

The apparatus shall be equipped with a sufficient quantity of lights to properly illuminate the ground areas around the apparatus in accordance with current NFPA requirements. The lights shall be 4" circular with clear lenses mounted in a resilient shock absorbent mount for improved bulb life. The wiring connections shall be made with a weather-resistant plug in style connector.

Ground area lights shall be switched from the cab dash with the work light switch.

One (1) ground light shall be supplied under each side of the front bumper extension if equipped.

Lights in areas under the driver and crew area exits shall be activated automatically when the exit doors are opened.

### **242. Recessed Step Light**

Two (2) recessed incandescent 4" light with clear lens shall be provided to illuminate the step at the location specified.

Location: one (1) each side of the top mount walkway.

## **LIGHTS - DECK AND SCENE**

### **243. Deck Lights**

Two (2) Unity model AGS4413 6" chrome-plated 12-volt, 35-watt floodlights shall be installed at the rear of the apparatus. Each light shall be manually operated by an on/off switch at the light.

Location: rear body/beavertail area on the trailing edge up high

### **244. Hose Bed Light**

A Truck-Lite rectangular light shall be installed at the front area of the hose bed to provide illumination per current NFPA 1901. The rectangular rubber housing shall contain a 12 volt, 2700 candlepower halogen floodlight bulb. The hose bed light shall be switched with work light switch in the cab.

### **245. Deck/Scene Light Wired to Back-up**

The rear deck or scene lights shall be activated when the chassis is placed in reverse to provide additional lighting, in addition to the back-up lights, when backing the vehicle.

### **246. Scene Lights**

Two (2) Federal GHSCENE lights with clear lenses shall be provided. Each light shall include (2) 20 watt halogen fixtures within the light housing. Both lights, within each housing, shall be adjustable horizontally and vertically to provide desired coverage. All electrical connectors are to be enclosed in the housing providing protection against the elements.

The light shall be 12VDC, 40 watts, and provide 1050 candelas.

Lights shall be located (1) each side of cab, rwd of fwd doors, up high and switched in cab (side facing lights switched separately).

### **247. Cab Scene Light Switching**

The cab scene lights shall be wired to activate through the appropriate side cab door ajar switch. This application allows the cab scene lights to be used as additional illumination of the ground area for personnel entering or exiting the vehicle. The switching for this application is in addition to the standard cab scene light switching.

## **LIGHTS - NON-WARNING**

### **248. Engine Compartment Light**

There shall be lighting provided in compliance with NFPA to illuminate the engine compartment area.

### **249. Pump Compartment Light**

An incandescent light shall be provided in the pump compartment area for NFPA compliance. The light shall be wired to operate with the work light switch in the cab.

### **250. Pump Panel Light Package**

Two (2) Weldon #2030 lights shall be mounted under a light shield directly above each side pump panel with the top mount panel having three (3) lights. The work light switch in the cab shall activate the lights when the park brake is set.

## **CONTROLS / SWITCHES**

### **251. Foot Switch**

A heavy duty metal floor mounted foot switch shall be installed to operate the audible warning device. It shall be located driver's side floor area.

### **252. Foot Switch**



Volts: 120/240 volts  
Phase: Single, 4 wire  
Frequency: 60 Hz  
Amperage: 66 amps @ 120 volts or 33 amps @ 240 volts  
Engine speed at engagement: Recommend below 1000 RPM  
Operation range: 800 to 2100 RPM

Notes:

- \*All ratings and capacities shall be derived utilizing current NFPA 1901 test parameters.
- \*Extreme ambient temperatures could affect generator performance.

## **GENERATOR TEST**

### **256. 3rd Party Generator Testing**

The generator shall be tested at the manufacturer's facility by an independent, third-party testing service. The conditions and testing of the generator shall be as outlined in current NFPA 1901.

The test shall include operating the generator for two hours at 100% of the rated load. Power source voltage, amps, frequency shall be monitored. The prime mover's oil pressure, water temperature, transmission temperature (if applicable) and power source hydraulic fluid temperature (if applicable) shall be monitored during testing.

The results of the test shall be recorded and provided with delivery documentation.

## **BREAKER BOXES**

### **257. Circuit Breaker Panel**

An eight (8) place breaker box with up to six (6) appropriately sized ground-fault interrupter circuit breakers shall be supplied. The breaker box will include a master breaker sized according to the generator output which will occupy two (2) places. The breaker box will be located in the specified compartment, not to exceed 12' run of wire.

Dimensions: 12.50" high x 8.88" wide x 3.80" deep.

Location: L1 back wall above offset forward area.

## **LIGHT TOWERS**

### **258. Command Light Tower**

A Command Light Knight model KL450 light tower shall be provided. The light tower shall be a two-stage articulating device with a lighting bank on top of a second stage capable of 360 degrees continuous rotation. The light shall be elevated by 12 volt electric linear actuators; one (1) actuator shall elevate the light bank, and one (1) actuator shall adjust the light bank angle from 0 to 110 degrees.

The light bank shall have six (6) weatherproof 500 watt output, 120 volt quartz halogen lights. Light heads shall be mounted in three (3) pairs, giving two (2) vertical lines of three (3) when the lights are in the upright position. Power for light bank shall be transmitted through power collecting rings thus allowing 360+ degrees rotation in either direction. NO EXCEPTIONS.

Light tower shall be controlled with a 15` hand held umbilical line remote control. The storage station for the remote control unit shall be equipped with a button to activate the "Auto-Park" automatic nesting feature. The controls on the remote box shall be:

1. Three (3) switches, one (1) for each light bank.
2. One (1) light bank rotation switch.
3. One (1) switch for elevating lower stage.
4. One (1) switch for elevating upper stage.
5. One (1) indicator light to indicate when light bank is out of roof nest position.
6. One (1) indicator light to indicate when light bank is rotated to proper nest position.
7. One (1) on/off switch for the top mounted strobe light.

The controls shall be located next to the circuit breaker box.

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

A green strobe light shall be supplied with the light tower mounted at the highest position. A switch shall be provided on the hand held control head for the strobe light.

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

The light tower shall be located ahead of vista mounted side to side and hinged to driver side. The light tower shall have an override of the vehicles transmission that will not allow the vehicle to be operated while the tower is up.

## **RECEPTACLES**

### **259. Receptacle**

A 20 amp, 110-volt 3-prong straight blade, (NEMA #5-20) duplex receptacle with a weatherproof cover plate shall be installed.

Location: driver side rear wheel well offset forward, officer side rear wheel well offset forward

## **ELECTRIC CORD REELS**

### **260. Electric Cord Reel**

Hannay electric cord reel(s) (ECR 1616-17-18) shall be installed and located pump module storage pan officer side.

The reel(s) shall include 200` of black 10 gauge 3 conductor type SOWA cord. The cord shall be rated at 20 amps @ 110 volts. The end of the cord shall be terminated for the installation of a department required connector.

### **261. Cord Reel Rollers**

Stainless steel cord reel rollers shall be installed and located through a panel.

The rollers shall be located officer side pump module in line with reel.

The rollers shall facilitate smooth removal of the electric cord.

### **262. Cord Reel Rewind Switch**

A heavy duty rubber covered electric reel rewind button shall be installed officer side pump panel.

## **MISC LOOSE EQUIPMENT**

### **263. Winch Electric Portable Ramsey 8,000lbs**

A 8,000 lb portable winch manufactured by Ramsey Winch Company shall be provided. The 12-volt electric winch system shall be installed on a portable mounting system with two carrying handles.

The system shall included steel tubing insert, which will slide into specified body attachment points and secured with stainless steel pins.

The winch shall be equipped with a 12 volt pigtail with Anderson quick release electrical plug.

The winch shall have one (1) forward speed and one (1) reverse speed and shall be operated by a push button controller. With a minimum of twelve five feet (12`) of control cable and a weatherproof receptacle.

The winch shall be provided with a cable guide, with 95 feet of 5/16” diameter galvanized aircraft cable, and safety type hook assembly.

Factory warranty on Ramsey Winch shall be provided.

### **264. DOT Required Drive Away Kit**

Three (3) triangular warning reflectors with carrying case shall be supplied to satisfy the DOT requirement.

## **EXTERIOR PAINT**

### **265. Un-Painted Pump/Pre-Connect Module(s)**

All applicable pump application modules shall have a sanded finish (not painted job color). Includes upper and lower pump modules, crosswalk module and/or speedlay/pre-connect module (as applicable). Rear mounted body/pump module shall be painted job color.

## **266. Paint Custom Cab**

The apparatus cab shall be painted Akzo-Nobel FLNA3025 Red or equivalent. 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 aluminum cab 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 door shall be painted separately to assure proper paint coverage on body, door jambs and door edges.

Paint process shall feature Akzo-Nobel's high solid LV or equivalent products and be performed in the following steps:

- Corrosion Prevention - all raw materials shall be pre-treated with the Weather Jacket Corrosion Prevention system to provide superior corrosion resistance and excellent adhesion of the top coat.
- Akzo-Nobel Sealer/Primer LV or equivalent - acrylic urethane sealer/primer shall be applied to guarantee excellent gloss hold-out, chip resistance and a uniform base color.
- Akzo-Nobel High Solid LV or equivalent (Top coat) - a lead-free, chromate-free high solid acrylic urethane top coat shall be applied, providing excellent coverage and durability. A minimum of two (2) coats shall be applied.
- Akzo-Nobel High Solid LV or equivalent (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. 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 20 degree gloss meter.

## **267. Paint Body Small**

The apparatus body shall be painted Akzo-Nobel FLNA3025 Red or equivalent. 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 aluminum 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 door shall be painted separately to assure proper paint coverage on body, door jambs and door edges.

Paint process shall feature Akzo-Nobel's high solid LV or equivalent products and be performed in the following steps:

- Corrosion Prevention - all raw materials shall be pre-treated with the Weather Jacket Corrosion Prevention system to provide superior corrosion resistance and excellent adhesion of the top coat.
- Akzo-Nobel Sealer/Primer LV or equivalent - acrylic urethane sealer/primer shall be applied to guarantee excellent gloss hold-out, chip resistance and a uniform base color.
- Akzo-Nobel High Solid LV or equivalent (Top coat) - a lead-free, chromate-free high solid acrylic urethane top coat shall be applied, providing excellent coverage and durability. A minimum of two (2) coats shall be applied.
- Akzo-Nobel High Solid LV or equivalent (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, handrails, doors, lights, or other specified components shall be treated at the point of penetration with a corrosion inhibiting pre-treatment. 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, handrails, 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 20 degree gloss meter.

## **INTERIOR PAINT**

### **268. Cab Interior Color**

The interior of the cab shall be painted gray.

## **STRIPING**

### **269. Chassis and Body Stripe**

A straight chassis and body Scotchlite stripe, 6" minimum in width shall be supplied. The stripe shall be NFPA compliant with the color and location to be specified by the purchaser.

Location: bottom of stripe flush with top of bumper and straight back.

Color: White.

## **270. Rear Body Scotchlite Striping**

Printed chevron style Scotchlite striping shall be provided on the rear of the apparatus. The stripes shall consist of 6" Yellow/Red alternating stripes in an "A" pattern. The striping shall be located on the rear facing extrusions, panels, doors and inboard/outboard of the beavertails if applicable.

## **WARRANTY / STANDARD & EXTENDED**

### **271. Standard 1 Year Warranty**

Statement of Warranty

1-Year Standard or more.

The apparatus manufacturer shall provide a full 1-year standard warranty or more. All components manufactured by the apparatus manufacturer shall be covered against defects in materials or workmanship for a 1-year period or more. All components covered by separate suppliers such as engines, transmissions, tires, and batteries shall maintain the warranty as provided by the component supplier. A copy of the warranty document shall be provided with the proposal.

### **272. Lifetime Frame Warranty**

The apparatus manufacturer shall provide a full lifetime frame warranty. This warranty shall cover all apparatus manufacturer designed frame, frame members, and cross-members against defects in materials or workmanship for the lifetime of the covered apparatus. A copy of the warranty document shall be provided with the proposal. Frame warranties that do not cover cross-members for the life of the vehicle shall not be acceptable.

### **273. 10 Year 100000 Mile Structural Warranty**

The apparatus manufacturer shall provide a comprehensive 10-year/100,000-mile structural warranty. This warranty shall cover all structural components of the cab and/or body manufactured by the apparatus manufacturer against defects in materials or workmanship for 10 years or 100,000 miles, whichever occurs first. Excluded from this warranty are all hardware, mechanical items, electrical items, or paint finishes. A copy of the warranty document shall be provided with the proposal.

### **274. 10 Year Stainless Steel Plumbing Warranty**

The apparatus manufacturer shall provide a full 10-year stainless steel plumbing components warranty. This warranty shall cover defects in materials or workmanship of apparatus manufacturer designed foam/water plumbing system stainless steel components for 10 years. A copy of the warranty document shall be provided with the proposal.

### **275. 10 Year Paint and Corrosion Warranty**

The apparatus manufacturer shall provide a 10-year limited paint and corrosion perforation warranty. This warranty shall cover paint peeling, cracking, blistering, and corrosion provided the vehicle is used in a normal and reasonable manner.

The paint shall be prorated for 10 years as follows:

Topcoat & Appearance: Gloss, Color Retention, Cracking		Coating System, Adhesion & Corrosion: Includes Dissimilar metal corrosion, Flaking, Blistering, Bubbling	
0 to 72 months	100%	0 to 36 months	100%
73 to 120 months	50%	37 to 84 months	50%
		85 to 120 months	25%

Corrosion perforation shall be covered 100% for 10 years. Corrosion perforation is defined as complete penetration through the exterior metal of the apparatus.

The warranty period shall begin upon delivery of the apparatus to the original user-purchaser. A copy of the warranty document shall be provided with the proposal.

UV paint fade shall be covered in a separate warranty supplied by Akzo Nobel (Sikkens) and shall be for a minimum of 10 years.

## **SUPPORT, DELIVERY, INSPECTIONS AND MANUALS**

### **276. Approval Drawings**

A general arrangement drawing depicting the vehicles appearance shall be provided. The drawing shall consist of left side, right side, front, and rear elevation views.

Vehicles requiring pump controls shall include a general arrangement view of the pump operator's position, scaled the same as the elevation views.

### **277. Electronic Manuals**

Two (2) copies of all operator, service, and parts manuals **MUST** be supplied at the time of delivery in electronic format (CD-ROMs) -**NO EXCEPTIONS!** The electronic manuals shall include the following information:

Operating Instructions, descriptions, specifications, and ratings of the cab, chassis, body, installed components, and auxiliary systems.

Warnings and cautions pertaining to the operation and maintenance of the fire apparatus and fire fighting systems.

Charts, tables, checklists, and illustrations relating to lubrication, cleaning, troubleshooting, diagnostics, and inspections.

Instructions regarding the frequency and procedure for recommended maintenance.

Maintenance instructions for the repair and replacement of installed components.

Parts listing with descriptions and illustrations for identification.

Warranty descriptions and coverage.

The CD-ROM shall incorporate a navigation page with electronic links to the operators manual, service manual, parts manual, and warranty information, as well as instructions on how to use the manual. Each copy shall include a table of contents with links to the specified documents or illustrations.

The CD must be formatted in such a manner as to allow not only the printing of the entire manual, but to also the cutting, pasting, or copying of individual documents to other electronic media, such as electronic mail, memos, and the like.

A find feature shall be included to allow for searches by text or by part number.

These electronic manuals shall be accessible from any computer operating system capable of supporting portable document format (PDF). Permanent copies of all pertinent data shall be kept file at both the local dealership and at the manufacturer's location.

NOTE: Engine overhaul, engine parts, transmission overhaul, and transmission parts manuals are not included.

## **DEALER ADDED EQUIPMENT**

### **278 Dealer**

[1] In Station Delivery and Training with this Unit shall be supplied.

[1] Vehicle Dry Decking shall be supplied.

**[2] A medical cabinet with interior (no exterior) access door shall be supplied in place of a rear facing seats.**

[1] An equipment voucher in the amount of \$25,000 shall be supplied.

[1] A set of On-Spot Automatic Tire Chains shall be installed on truck.

[1] Travel for 2 Members of the Fire Department to Factory for factory tour and inspection of the facility shall be supplied, three days two nights. The factory tour shall take place within thirty days of the awarding of the truck.

[1] Travel for 2 Members of the Fire Department to Factory for Final Inspection and Acceptance shall be supplied, three days two nights.

[2] A set of Aluminum Cast Wheel Chocks and Mounting Hardware shall be included and installed one set in front of driver's rear wheels and one set in front of passenger's rear wheels.

[1] Akron Apollo deck gun installed with a set of stacked tips and stream straightener.

## **279. Electrical**

[1] A Portable Electric Junction Box shall be supplied.

[1] Department Specified 110 Volt Receptacles shall be supplied.

## **280. Fittings**

[1] 3" NST Female by 4 inch Storz 30 degree elbow with Cap & Chain shall be supplied for large discharge on pump panel.

[1] 3" NST Female by 4 inch Storz 30 degree elbow with Cap & Chain shall be supplied for direct tank fill.

All discharges from the pump panel will be supplied with a 30 degree elbow with Cap & Chain, each will be chrome plated.

## **281. Graphics**

[1] Cab & Body Lettering to meet Dept. Specification shall be supplied.

## **282. Hose**

[2] Length of light weight 6 inch Suction Hose, 10 feet in length shall be supplied.

[1] A 6 inch self leveling Floating Strainer shall be supplied.

## **283. Ladders**

[1] A 10 foot Aluminum folding type Attic Ladder with Mounting Brackets shall be supplied.

[1] A 14 foot Roof Ladder shall be supplied.

[1] A 24 foot Two Section Extension Ladder shall be supplied.

## **284. Tools**

[2] Pac Aluminum Mount Plate shall be installed in the customer designated Compartment (Example: L1); per Compartment Plate

## **285. MISC**

Supply magnetic drain plugs on all oils, (engine, transmission etc)

Hour meter for pump and engine

Install an air shut down button in the cab with a cover over it, this it to be used to prevent engine run away.

Install the Hurst power unit in the rear compartment on a roll out tray. The Hurst power unit will have the appropriate plumbing for the two reels that will be installed on the rear passenger's side compartment. Hurst power unit that will be provided by Belmont Fire Department is a Honda GXV160, 5.5 dual pump unit.

Install Hurst hose reels in the rear passenger's side compartment on a pull out tray. The hose reels will have an aluminum cover over them to prevent damage. Install hose rollers on the exterior doors to prevent damage or kinking of the hose when deployed from the hose reels.

Provide EVT training course on F-1 Inspection, Maintenance and testing, and EVT training on F-3 Fire Pump and Accessories, for the department's maintenance mechanic. The date and location of classes attended shall be at the discretion of the department (based on availability) and shall be completed before December 31, 2012. The department will provide travel expenses for the maintenance mechanic to attend both classes.