

SPECIFICATIONS  
FOR ONE  
CUSTOM PUMPER  
FOR THE  
TOWN OF PARADISE FIRE DEPARTMENT

**REQUEST FOR PROPOSAL TIMELINE**

February 28 <sup>th</sup>	Request for Proposal Released
March 24 <sup>th</sup> 3:00 PM	Bid Closes – <b><u>Post Marks Not Accepted</u></b> Bids must be submitted by the deadline to:  Town of Paradise – Town Clerks Office Fire Engine Custom Pumper Bid 5555 Skyway Paradise CA 95969
March 24 <sup>th</sup> 4:00 PM	Public Opening of the Bids

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## **INTENT OF SPECIFICATIONS**

It is the Town of Paradise intent that these specifications cover the furnishing and delivery to the Town a complete apparatus equipped as hereinafter specified. With a view of obtaining the best results and the most acceptable apparatus for service in the fire department, these specifications cover only the general requirements as to the type of construction and tests to which the apparatus must conform, together with certain details as to finish, equipment and appliances with which the successful bidder must conform. Minor details of construction and materials where not otherwise specified are left to the discretion of the bidder, who shall be solely responsible for the design and construction of all features. The apparatus shall conform to the requirements of the current (at the time of bid) National Fire Protection Association Pamphlet #1901 for Motor Fire Apparatus unless otherwise specified in these specifications.

Bids shall be considered only from companies which have a reputation for quality products in the field of fire apparatus construction and have been in business for a minimum of twenty (20) years.

Each bid shall be accompanied by a set of "Contractor's Specifications" consisting of a detailed description of the apparatus and equipment proposed and to which the apparatus furnished under contract must conform. Computer run-off sheets are not acceptable as descriptive literature.

The specifications shall indicate size, type, model and make of all component parts and equipment.

## **STATEMENT OF EXCEPTIONS TO NFPA 1901**

If, at the time of delivery, the apparatus manufacturer is not in compliance, a statement of exceptions must be provided as follows:

- The specific standard affected.
- A statement describing why the manufacturer is not in compliance.
- A description of the remedy, and who the responsible party is.

The document must be signed by an officer of the company, and an authorized agent of the purchaser. **NO EXCEPTIONS**

### **QUALITY AND WORKMANSHIP**

The design of the apparatus must embody the latest approved automotive engineering practices.

The workmanship must be the highest quality in its respective field. Special consideration shall be given to the following points: Accessibility to various areas requiring periodic maintenance, ease of operation (including both pumping and driving) and symmetrical proportions.

Construction must be rugged and ample safety factors must be provided to carry loads as specified and to meet both on and off road requirements and speed as set forth under "Performance Test and Requirements."

### **PERFORMANCE TESTS AND REQUIREMENTS**

A road test shall be documented with the apparatus fully loaded and a continuous run of ten (10) miles or more shall be made under all driving conditions, during which time the apparatus shall show no loss of power or overheating. The transmission drive shaft or shafts, and rear axles shall run quietly and free from abnormal vibration or noise throughout the operating range of the apparatus. The apparatus, when loaded, shall be approximately 66% on the rear axle. The successful bidder shall furnish a weight certification showing weight on the front and rear axle, and the total weight of the completed apparatus at the time of delivery.

- a. The apparatus must be capable of accelerating to 30 MPH from a standing start within 25 seconds on a level concrete highway without exceeding the maximum governed engine RPM.
- b. The service brakes shall be capable of stopping the fully loaded vehicle within 35 feet from a speed of 25 MPH on a level concrete highway.
- c. The apparatus, fully loaded, shall be capable of obtaining a speed of 50 MPH on a level highway with the engine not exceeding 95% of its governed RPM (full load).

- d. The apparatus shall be tested and approved by a qualified testing agency in accordance with their standard practices for pumping engines.
- e. The contractor shall furnish copies of the Pump Manufacturer's Certification of Hydrostatic Test (if applicable), the Engine Manufacturer's current Certified Brake Horsepower Curve and the Manufacturer's Record of Construction Details.

### **FAILURE TO MEET TESTS**

In the event the apparatus fails to meet the test requirements of these specifications on the first trial, a second trial may be made at the option of the bidder within thirty (30) days of the date of the first trials. Such trials shall be final and conclusive and failure to comply with these requirements shall be cause for rejection. Permission to keep and/or store the apparatus in any building owned or occupied by the Town shall not constitute acceptance of same.

### **EXCEPTIONS TO SPECIFICATIONS**

The following specifications shall be strictly followed by all bidders. Exceptions shall be considered if they are deemed equal to or superior to the specifications at the sole discretion of the Town, provided they are fully explained on a separate page entitled "EXCEPTIONS TO SPECIFICATIONS." Exceptions shall be listed by page and paragraph.

Failure to denote exceptions in the above manner shall result in automatic rejection of the bid. In addition a general statement taking "TOTAL EXCEPTION" to the specifications shall result in immediate rejection of bid.

### **GENERAL CONSTRUCTION**

The apparatus shall be designed and the equipment mounted with due consideration to distribution of load between the front and rear axles so that all specified equipment, including filled water tank, a full complement of personnel and fire hose shall be carried without injury to the apparatus. Weight balance and distribution shall be in accordance with the recommendations of the International Association of Fire Chiefs and National Fire Association (or American Insurance Association). Certified Laboratories certificate shall be submitted by the manufacturer. Weight of apparatus shall meet all federal axle load laws.

### **DELIVERY REQUIREMENTS**

The apparatus shall be completely equipped as per these specifications upon arrival and on completion of the required tests shall be ready for immediate service in the fire

department of the Town of Paradise, California. Any and all alterations required at the scene of delivery to comply with these specifications must be done at the contractor's expense.

### **PURCHASER RIGHTS**

The Town of Paradise shall award the bid to the lowest responsible bidder to these specifications. The Town reserves the right to reject any bid. The Town also reserves the right to award in its best interest and reserves the right to waive any non-material formalities in a bid

### **U.S.A. MANUFACTURER**

The entire apparatus shall be assembled within the borders of the Continental United States to ensure more readily available parts (without added costs and delays caused by tariffs and customs) and service, as well as protecting the purchaser should legal action ever be required.

### **MANUFACTURER'S EXPERIENCE**

Each manufacturer shall have been in business making similar apparatus for a minimum of twenty (20) years.

### **ELIMINATION OF DIVIDED RESPONSIBILITY**

It is required that each bidder produce both the chassis and complete apparatus. To eliminate divided responsibility and service, the chassis and body must be manufactured by the same Company. Manufacturer shall state the number of years the Company has been producing their own chassis and body. Manufacturer shall state compliance with the paragraph. NO EXCEPTIONS.

### **FAMA COMPLIANCE**

Manufacturer must be a current member of the Fire Apparatus Manufacturer's Association.

## **PRICING OF FUTURE PURCHASES AND “TAG ON” ORDERS**

Apparatus purchased in future years beyond the bid award date are subject to cost increases for material and labor. The successful bidder shall extend the proposed price for future years through the use of the U.S. Bureau of Labor Statistics, Producer Price Index (PPI) to calculate the selling price increase.

Series ID - PCU3361203361203  
Industry - Heavy Duty Truck Manufacturing  
Product - Buses, Including military and firefighting vehicles

The price adjustment shall not exceed the percentage adjustment of the PPI at the time of the bid opening date to the most current month for which the statistic is available. The original quoted price shall be the base price.

Note: 2010 model year engine and cooling package changes shall be an exception to the above statement. Any new apparatus purchased requiring the newer engines shall be subject to the cost associated with engine and cooling package and all other related chassis components.

[www.bls.gov](http://www.bls.gov)

## **FUTURE PURCHASES AND “TAG ON” ORDERS**

The successful bidder shall accept “tag on” orders to this bid proposal for a period not to exceed three (3) years from the bid opening date. The successful bidder shall honor the “tag on” order from any municipality within the United States or Canada.

## **CONFIGURATION OF TAG ON ORDERS**

In many cases the entity wishing to “tag on” to an existing order may require their apparatus to be configured differently from the original proposed apparatus. The successful bidder shall allow changes to the configuration within good engineering guidelines. The changes shall be subject to current pricing in effect at the time of order. For example, a different engine may be required. This shall be considered a “change order” and the purchase price shall be adjusted up or down depending on the current option price.

## **BID SEQUENCE**

For ease of evaluation, all bid proposals shall be submitted in the same order as the fire department’s specification. **NO EXCEPTIONS.**

## **PROPOSAL DRAWING**

A general layout drawing depicting the apparatus layout and appearance shall be provided with the bid. The drawing shall consist of left side, right side, frontal and rear elevation views. Apparatus equipped with a fire pump, shall have a general layout view of the pump operators panel scaled the same as the elevation views. The drawing shall be a depiction of the actual apparatus proposed and not of a generic similar product.

## **APPROVAL DRAWING**

After the award of bid and pre-construction conference, a detailed layout drawing depicting the apparatus layout and appearance including any changes agreed upon shall be provided for customer review and signature. The drawing shall become part of the contract documents. The drawing shall consist of left side, right side, frontal and rear elevation views. Apparatus equipped with a fire pump, shall have a general layout view of the pump operators panel scaled the same as the elevation views.

## **PRE-CONSTRUCTION CONFERENCE**

After award of the contract, and prior to construction of the apparatus, a pre-construction conference shall be held at the facility of the manufacturer. A provision shall be provided in the bid price for all travel, food and lodging to accommodate three (3) Fire Department personnel.

## **INSPECTION TRIPS**

An inspection trip at the manufacturer's facility prior to delivery of the completed apparatus shall be provided. Accommodations for three (3) Fire Department personnel to include all transportation, food and lodging shall be included in the bid price. A total of 4 (four) inspection trips shall be included (1) pre-construction, (2) Chassis and wire, (3) Prior to Paint and (4) pre-final.

## **PROPOSAL GUARANTEE**

A certified check or bid bond in the sum of ten percent (10%) of the total bid price shall be submitted with the "Bid Proposal" at the time of the bid. The full amount of the bid surety shall be returned to the unsuccessful bidders following the award of the contract to the successful bidder.

## **PERFORMANCE BOND**

Within twenty (20) days of notification to the successful bidder by the purchaser, prior to any work commencing on the proposed apparatus, the successful bidder shall, at their

own expense, obtain and submit to the purchasing entity a performance bond in the amount of 100% equal to the total contract price.

Additionally, each bidder must disclose the price/amount it pays for bonding, per \$1,000. This is to demonstrate the economic stability and credit worthiness of the bidder. NO EXCEPTIONS.

## **CHASSIS**

The chassis shall be manufactured in the factory of the bidder. The chassis shall be designed and manufactured for heavy duty service with adequate strength and capacity of all components for the intended load to be sustained and the type of service required. There shall be no divided responsibility in the production of the apparatus.

## **ALUMINUM CAB**

The cab shall be a full tilt 6-person cab designed specifically for the fire service and manufactured by the chassis builder.

Cab shall be built entirely by the apparatus manufacturer within the same facilities (no exceptions).

## **CAB DESIGN**

The cab shall be designed specifically for the fire service and manufactured by the chassis builder.

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

The cab shall be of a fully open design with no divider wall or window separating the front and rear cab sections.

Construction of the cab shall consist of high strength 5052H32 aluminum welded to extruded aluminum framing of 6061-T6 material.

The cab roof shall utilize extruded, radiused outer corner rails with integral drip channel and box tubing type cross brace supports.

The cab sides shall be constructed from extruded door pillars and posts that provide a finished door opening, extruded and formed wheel well openings supports, formed aluminum wheel well liners and box tubing type support braces.

The cab floor and rear cab wall shall utilize box tubing type framing and support bracing.

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

The structural extrusion framework shall be overlaid with interlocked aluminum alloy sheet metal panels to form the exterior skin of the cab.

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

### **CAB SUB-FRAME**

The cab shall be mounted to a steel box tube sub-frame, and shall be isolated from the chassis, through the use of no less than six (6) elastomeric bushings. The sub frame shall be painted to match the primary chassis color.

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

### **CAB TILT SYSTEM**

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

The lift system shall be comprised of two (2) hydraulic lift cylinders, an electrically driven hydraulic pump, and a control switch. A mechanical locking system shall be provided to ensure the cab remains in the raised position in the event of a hydraulic failure.

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

### **CAB DIMENSIONS**

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

Cab Width (excluding mirrors)	98"
Cab Length (from C/L of front axle)	
To front of cab (excluding bumper)	68"
To rear of cab	56"
Total Cab Length (excluding bumper)	124"

## **INTERIOR**

The cab interior shall have Zolatone gray/black rubberized, mar resistant, textured finish.

## **FENDER CROWNS**

Polished stainless steel front axle fenderettes with full depth radiused wheel well liners shall be provided.

## **GRILLE**

The front of the cab shall be equipped with a stainless steel grille with sufficient area to allow proper airflow into the cooling system and engine compartment.

## **CAB INSULATION**

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

## **ROOF DESIGN**

The cab shall be of a flat roof design with side drip rails and shall satisfy the following **minimum** height dimensions:

### Cab Dimensions Interior

Front	59"
Rear	55"

### Cab Dimensions Exterior

Front	65"
Rear	65"

## **EXTERIOR GLASS**

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

Two (2) fixed position side windows shall be provided between the forward cab area and the crew cab area, one (1) each side and shall utilize tinted, tempered automotive approved safety glass. The windows shall be approximately 20.5" high x 16.50" wide to

provide maximum visibility. The side windows shall be held in place by an extruded rubber molding.

The cab door and canopy windows shall utilize tinted, automotive approved safety glass.

### **SUN VISORS**

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

### **CAB STEPS**

The lower cab steps shall be no more than 22" from the ground. An intermediate step shall be provided, mid way between the lower cab step, and the cab floor.

The intermediate step shall be slightly inset to provide for safer ingress and egress. All steps shall be covered with material that meets or exceeds the NFPA requirements for stepping surfaces.

### **STEP LIGHTS**

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

### **CAB STRUCTURAL INTEGRITY**

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

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

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

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

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

### **SEAT BELT TESTING**

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

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

### **MANUAL CAB LIFT**

There shall be a manually operated hydraulic pump for tilting the cab in case the main pump should fail. Access to the pump shall be located under the left corner of the front bumper.

### **CAB DOORS**

The cab doorframes shall be constructed from aluminum extrusions fitted with an aluminum sheet metal skin and shall be equipped with dual weather seals. The cab doors shall be equipped with heavy-duty door latching hardware, which complies with FMVSS 206. The mechanics of the door operation shall utilize rod linkage for positive operation. A rubber coated nylon web doorstop shall be provided.

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

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

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

Door Opening:	
Front	36.5" x 73"
Rear	36.5" x 73"

### **POWER WINDOWS**

All four cab entry doors shall have power windows. Each door shall be individually operated and the driver's position shall have master control over all windows. The front windows shall roll down completely.

## **WINDOW TINTING**

The crew cab windows and doors, with the exception of the driver's and officer's doors, and the windshield, shall be tinted with deep "limo" tint.

## **GLOVE BOX**

A glove box shall be provided and located directly in front of the officer position.

## **DELUXE CONSOLE**

There shall be a deluxe console mounted on the engine hood between the driver and officer. The console shall be covered in black vinyl material to match the engine hood. The console shall come complete with two drink holders, and recessed wells for storage of gloves or other miscellaneous items.

The outboard sections shall contain duct work to direct air flow from the heater/AC towards the driver and officer.

## **INTERIOR DOOR PANELS**

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

The lower portion of the doors shall also have a 304 brushed stainless steel scuff plate and shall include a total of 245 square inches of reflective material on each door, exceeding the NFPA requirement of 96 square inches. The layout shall be opposing ruby red "chevron" stripes on each side. The red striping shall be laid over white 3M reflective materials. The reflective decal shall be plainly visible to oncoming traffic when the doors are in the open position.

## **CAB ACCESSORY FUSE PANEL**

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

## **AIR HORNS**

Two (2) Grover 2040 Stuttertone rectangular, chrome plated, air horns shall be recess mounted, one (1) each side behind the perforated grille of the bumper. The air horns shall be controlled by a toggle switch wired through the horn button. A foot switch for the air horns shall also be provided on the officer's side.

## **ALTERNATOR**

A 320 ampere Prestolite/Leece Neville Model 4962PA, alternator with serpentine belt shall be provided. The alternator shall generate 260 amperes at idle.

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

## **FRONT AXLE**

A Meritor™ MFS-18-133A non-driving, front steer axle with a capacity 18,000 pounds shall be provided. The axle shall have a 3.74" dropped I-beam, 10 bolt, hub piloted, furnished with oil seals.

## **REAR AXLE**

The rear axle shall be a Meritor™ RS-24-160 single reduction drive axle with a capacity of 24,000 lbs. The axles shall be hub piloted, 10 studs, furnished with oil seals.

## **TOP SPEED**

Rear axle speed approximately 65 MPH.

## **AUTOMATIC TIRE CHAIN SYSTEM**

The apparatus shall be equipped with an On-Spot brand Automatic Tire Chain System.

There shall be one driver's side and one passenger's side chain unit.

A continuous duty solenoid shall be provided and activated by the dashboard switch, which opens and allows compressed air to flow to the chain units. Compressed air shall be delivered to the solenoid from the vehicle's air tank. The solenoid shall be mounted on the frame rail or crossmember in close proximity of the chain units. This air/electric solenoid shall be 12-volts and draw no more than 1 ampere of current. Electrical wire shall be in accordance with NFPA 1901.

A 12-volt dashboard switch shall be provided so that the operator may engage the chains from the driver's seat. The switch shall be lighted to indicate when the chains are engaged. The switch shall come complete with a switch guard to avoid accidental engagement of the automatic chains. The switch guard shall be properly labeled. A dashboard sticker with operating instructions shall be provided.

## **BATTERIES**

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

The batteries shall be installed in a vented 304 stainless steel battery box with a removable aluminum cover to protect the batteries from road dirt and moisture. The batteries are to be placed on dri-deck and secured with a fiberglass hold down. The batteries shall be wired directly to starter motor and alternator.

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

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

## **BATTERY CHARGING**

A Kussmaul Auto Charge 1200 battery system charger shall be provided. The Auto Charge 1200 is a fully automatic battery charger with a very high output for vehicles with a single battery system. A single bar graph display is provided to indicate the state of charge of the battery system. The rated output shall be 40 amps for the vehicle battery system.

A Kussmaul Model 091-55-20-120 super electric auto-eject with weatherproof cover and power interrupt shall be provided.

## **BATTERY JUMPER TERMINAL**

There shall be one set (two studs) of battery jumper terminals located by the battery box under the cab. The terminals shall have plastic color-coded covers. Each terminal shall be tagged to indicate positive/negative.

## **BRAKES (Front)**

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

## **BRAKES (Rear)**

The rear brakes shall be Meritor S-cam style. They shall be 16.5" x 7" with heavy duty return springs, and a double anchor pin design. They shall also have quick change shoes for fast easy brake relining.

## **AIR BRAKE SYSTEM**

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

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

All main brake lines shall be color-coded nylon type protected in high temperature rated split plastic loom. The brake hoses from frame to axle shall have spring guards on both ends to prevent wear and crimping as they move with the suspension. All fittings for brake system plumbing shall be brass.

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

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

Four (4) supply tanks shall be provided. One air reservoir shall serve as a wet tank and a minimum of one tank shall be supplied for each the front and rear axles. A Schrader fill valve shall be mounted in the front of the driver's step well.

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

activate the parking brake and to provide parking brake modulation in the event of a primary air system failure.

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

### **AIR BRAKING ABS SYSTEM**

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

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

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

### **ELECTRONIC STABILITY CONTROL SYSTEM**

An Arvin Meritor / Wabco Electronic Stability Control (ESC) system shall be provided and installed. The ESC system continually monitors the vertical acceleration, and yaw (horizontal plain rotation) of the vehicle, and compares it to a critical threshold where vehicle rollover may occur. When the critical threshold is met, the ESC shall intervene by reducing engine torque and engaging the engine retarder, while automatically applying both the steering and drive axle brakes as needed. In many cases, activation occurs before the driver is even aware it is needed.

### **BUMPER**

There shall be a 12" high double rib polished stainless steel wrap-around bumper provided at the front of the apparatus. Laser cut perforated grilles shall be incorporated

into the bumper and located at the outboard section of the bumper for the air horns and at the center for the siren speaker. The bumper shall be mounted to a reinforcement plate constructed of 1/4" x 10" x 70" carbon steel. A gravel shield shall be provided, constructed of .188" aluminum diamond plate. The bumper extension shall be approximately 16".

### **VINYL COVER**

There shall be a vinyl cover for the storage well in the extended front bumper.

### **STORAGE WELL COMPARTMENT**

There shall be a hose well compartment located in the center of the front bumper. The compartment shall be approximately 32" wide x 8" long x 12" deep. The compartment shall be constructed of .125" smooth aluminum plate.

### **COOLING SYSTEM**

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

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

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

### **RADIATOR**

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

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

## **CHARGE AIR COOLER**

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

## **COOLANT**

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

## **HOSES & CLAMPS**

Silicone hoses shall be provided for all engine coolant lines.

All radiator hose clamps shall be spring loaded stainless steel constant torque hose clamps for all main hose connections to prevent leaks. Recirculation shields shall be installed where required to prevent heated air from reentering the cooling package and affecting performance.

## **FAN**

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

A shroud and recirculation shield system shall be used to ensure air that has passed through the radiator is not drawn through again.

The fan tip to radiator core clearance shall be kept at a minimal distance to increase the efficiency of the fan and reduce fan blast noise.

## **FAN CLUTCH**

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

## **SURGE TANK**

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

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

## **DRIVELINE**

The driveline shall consist of Spicer 1710 series, or equal, dual grease fitting universal joints with "Half-Round" end yokes. The drive shaft shall be built with a heavy-duty steel tube 4.095" outside diameter x .180 wall thickness. The shafts shall be dynamically balanced prior to installation into the chassis. A splined slip joint shall be provided in each shaft assembly. Universal joints shall be extended life. There shall be two (2) Zerk fittings in each universal joint assembly so the joint can be greased without turning the shaft.

## **ENGINE ENCLOSURE**

An integral, formed aluminum and composite engine enclosure shall be provided. The engine enclosure shall be contoured and blended in an aesthetically pleasing manner with the interior dash and flooring of the cab. The enclosure shall be kept as low as possible, to maximize space and increase crew comfort.

The enclosure shall be constructed from 5052 H2 aluminum plate and GRP composite materials, providing high strength, low weight, and superior heat and sound deadening qualities. The exterior shall be covered in heavy duty, molded black vinyl, further reducing noise and heat in the cab.

The underside of the engine enclosure shall be covered with a sound deadening, heat reflective insulation system, and shall further minimize noise (DB levels), and eliminate engine heat from the front and rear of the cab. The insulation material shall be bonded with adhesive and mechanically fastened to the underside of the cab. All seams shall be sealed to prevent water absorption. **NO EXCEPTIONS**

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

## **ENGINE**

The apparatus shall be powered by a Cummins Diesel ISL 450 HP.

## **ENGINE WARRANTY**

The engine shall have a five year or 100,000 mile warranty and approval by Cummins for installation in the chassis. There shall be no deductible for the first two years. A one hundred dollar deductible shall apply for service during the next three years.

## **AIR COMPRESSOR**

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

## **STARTER**

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

## **FUEL FILTERS**

The engine fuel filters shall be mounted in a manner that is easily accessible for service or replacement. The fuel filtration system utilizes a FleetGuard FF2200 spin on filter remotely located on the pressure side of the common rail fuel system. A secondary filter mounted to the engine shall be provided and approved for use by Cummins.

## **EXHAUST SYSTEM**

The engine exhaust system shall include the following components:

- Diesel Particulate Filter (DPF)
- Diesel Oxidation Catalyst (DOC)
- Diesel Exhaust Fluid (DEF)
- Selective Catalytic Reduction Filter (SCR)

The SCR catalyst utilizes the DEF fluid, which consists of urea and purified water, to convert NOx into nitrogen and water. This shall meet or exceed 2010 EPA emissions requirements.

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

### **AFTER TREATMENT SYSTEM**

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

### **AIR CLEANER/INTAKE**

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

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

An ember separator shall be provided in the engine air intake meeting the requirements of NFPA 1901.

An Air Restriction warning light shall be provided and located on the cab dash.

### **ENGINE BRAKE**

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

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

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

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

### **DIESEL EXHAUST FLUID TANK**

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

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

A placard shall accompany fill location noting DEF specifications.

### **FRAME**

The chassis frame shall be of a ladder type design utilizing industry accepted engineering best practices. The frame shall be specifically designed for fire apparatus use. Each frame rail shall be constructed of two 3/8" thick-formed channels. The outer channel shall be 10.06" x 3.50" x .375" and the inner channel (liner) shall be 9.31" x 3.13" x .375". The section modulus shall be 31.28 in.<sup>3</sup>. The resistance to bending moment (RBM) shall be 1,569,160 in./lbs. The cross-members shall be constructed of minimum 3/8" formed channels and have formed gusseted ends at the frame rail attachment.

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

The frame shall be painted glossy black prior to installing wiring harness and other components.

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

### **FUEL TANK**

The chassis shall be equipped with a 65-gallon stainless steel rectangular fuel tank. The fuel tank shall be certified to meet FMVSS 393.67 tests. It shall also maintain engine manufacturer's recommended expansion room of 5%.

The tank shall be removable by means of six (6) bolted connections and dropped. One (1) tank baffle shall be used.

Dual pick-up and return ports with a single 3/4" tank drawtube shall be provided for diesel generators if required.

The fuel tank shall be equipped with a 2 1/4" filler neck assembly with a 3/4" vent located on the left hand side of the tank. A fuel fill cap attached with a lanyard shall be provided. The bottom of the fuel tank shall contain a 1/2" drain plug.

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

The fuel tank shall be mounted in a saddle with a barrier between the tank and the saddle.

### **FUEL COOLER**

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

### **CAB HANDRAILS**

There shall be four (4) 24" long, handrails provided and installed, one (1) at each cab entrance. The handrails shall be constructed of 1-1/4" diameter, knurled and anodized, 3/8" heavy wall extruded aluminum and mounted utilizing chrome stanchions, which shall provide sufficient space to allow for a gloved hand to grip the rail.

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

### **HEATER/DEFROSTER/AIR CONDITIONER**

There shall be a minimum 44,000 cool BTU and 60,000-heat BTU single unit, heater/air conditioner mounted over the engine cover. The unit shall be mounted in center of the cab on the engine hood/enclosure. Unit shall have a shutoff valve at the right side of the frame, next to the engine. Airflow of the heater/air conditioner shall be a minimum 1200 CFM. To achieve maximum cooling, a TM-16 Compressor (10 cu. in.) shall be used. There shall be ductwork to the floor of the cab, facing forward to provide heat for the front of cab floor area.

The defroster/heater shall be a minimum of 39,000 BTU and shall be a separate unit mounted over the windshield. There shall be eight (8) louvers/defusers to direct to

windshield and door glass. Airflow of the defroster/heater shall be a minimum 350 CFM. The unit shall be painted Zolatone greystone to match the cab ceiling.

The condenser shall be roof mounted and have 60,000 BTU rating. The unit shall include two fan motors. Airflow of the condenser shall be a minimum 2250 CFM. (This roof-mounted condenser shall work at full rated capacity at an idle with no engine heat problems.)

### **HEATER/DEFROSTER/AIR CONDITIONING CONTROLS**

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

### **LOAD MANAGER**

Load manager shall have the ability to sequence loads on and off. It shall also be able to shed 8 loads when the vehicle is stationary, starting at 12.7 volts lowest priority load to be shed, then respectively at 12.6, 12.4, 12.2, 12.0, 11.8, 11.4 and 11.0 volts DC. Any load that has been shed shall be off for a minimum of five minutes, and then if voltage has rebounded above shed voltage, the shed load shall automatically come on. There shall also be an indicator panel along side the rocker switches, which indicate power is on, battery warning and fast idle. Battery warning indicator shall flash at a rate proportional to the voltage discharge rate.

### **AUTOMATIC HIGH IDLE ACTIVATION**

The load management system shall be capable of activating the apparatus high idle system when the system voltage drops below 12.3 volts DC. The system shall raise engine speed for a minimum of five minutes until voltage exceeds 13.0 volt DC. The load management system shall activate the high idle feature before any devices are automatically shed OFF. The high idle function request from the load management device shall function only if the appropriate interlocks are present; that is, control of the high idle system is monitored and shall be superseded by the state of the interlock control module. The automatic high idle system shall be deactivated whenever the brake pedal is pressed, and shall remain inactive for two minutes thereafter to allow an operator to override the high idle function and return the engine to idle before PTO engagement.

### **INSTRUMENT PANEL**

The main dash shroud, which covers the area directly in front of the driver from the doorpost to the engine hood, shall be custom molded and covered with a non-glare black vinyl. The dash shall be a one-piece hinged panel that tilts outward for easy access to service the internal components. The gauge panel shall be constructed of durable aesthetically pleasing light gray polymer material, placed over a heavy duty steel backing plate, for added strength and durability.

The gauges shall be Beede Instruments, NexSys Link gauges with built-in self-diagnostics and red warning lights to alert the driver of any problems. All gauges and controls shall be backlit for night vision and identified for function. All main gauges and warning lights shall be visible to the driver through the steering wheel.

### **MASTER BATTERY & IGNITION SWITCH**

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

### **DIESEL PARTICULATE FILTER CONTROLS**

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

### **INSTRUMENTATION & CONTROLS**

Instrumentation on dash panel:

- Tachometer/hourmeter with high exhaust system regeneration temperature, and instrument malfunction indicators
- Speedometer/odometer with built in turn signal, high beam, and re-settable trip odometer
- Voltmeter
- Diesel fuel gauge
- DEF (Diesel Exhaust Fluid) gauge
- Engine oil pressure
- Transmission temperature
- Engine temperature
- Primary air pressure
- Secondary air pressure

Indicators and warning lights visible to driver:

- Battery on
- Parking brake engaged
- Low air with buzzer

- Turn signals
- Hi-beam
- Transmission temperature
- Do not shift transmission
- Check transmission
- Stop engine with buzzer
- Check engine
- Regeneration
- High exhaust temperature
- Air filter restriction light
- Back pressure
- Cab door open (flashing)
- Compartment door open (flashing)
- Antilock brake warning
- Low voltage

Other indicator and warning lights

- Differential locked
- PTO (s) engaged
- Auto-slip response
- Retarder engaged
- Retarder temperature

Controls located on main dash panel:

- Master power disconnect with ignition switch
- Engine start switch
- Headlight switch
- Windshield wiper/washer switch
- Differential lock switch (if applicable)
- Dimmer switch for backlighting

Controls included in steering column:

- Horn button
- Turn signal switch
- Hi-beam low-beam switch
- 4-way flasher switch
- Tilt-telescopic steering wheel controls

Controls, gauges and indicator lights located to the right of driver's position:

- Transmission shifter
- Pump shift control with OK TO PUMP and PUMP ENGAGED lights
- Heater/defroster controls
- Eighteen (18) illuminated rocker switches

- Parking brake control

Driving compartment warning labels shall include:

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

Additional labels included:

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

## **ENGINE WARNING SYSTEM**

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

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

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

## **WIRING**

All wiring shall have XL high temperature crosslink insulation and shall be 10 gauge, 12 gauge, 14 gauge and 18 gauge depending on load. All wiring shall be color-coded, and the function and number stamped at 3" intervals on each wire. All wiring shall be covered with high temperature rated split loom for easy access to wires when trouble shooting. All electrical connectors and main connectors throughout the chassis shall be treated to prevent corrosion.

## **DOOR AJAR INDICATION**

Four (4) red LED lights are provided in the forward cab overhead console area, visible to both driver and officer. Upon releasing the apparatus parking brake one or more of these lights shall automatically illuminate (flash) if any cab door is open, compartment door is open, any ladder or equipment rack is not in stowed position, stabilizer system

deployed or any other device has not been properly stowed that may cause damage if the apparatus is moved.

## **MASTER ELECTRICAL PANEL**

The chassis main breaker panel shall be wired through the master disconnect solenoid and controlled with a three-position ignition rocker switch. Circuit breakers and flashers shall be located at officer's right side lower interior firewall with removable cover and schematic provided with notebook holder on outside cover.

A deluxe breaker panel with up to 22 ground switched relays with circuit breaker protection shall be provided.

An integrated electrical sub-panel shall be provided and interfaced to the body and chassis through an engineered wire harness system.

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

Additional four relay boards with circuit breaker protection for additional loads. Maximum two boards (8 relays) per breaker panel. All relay boards set up to trip with input from switch of positive-negative or load manager by moving connector on board (no tools needed to do this).

All relay boards shall be equipped with a power-on indicator light (red), input indicator light (green) and power output indicator light (red).

Up to 23 additional automatic reset circuit breakers for non-switched loads that are remotely switched (ie: heater fans, hood lights, etc.).

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

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

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

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

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

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

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

### **PUMP SHIFT MODULE**

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

### **HIGH IDLE**

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

### **VEHICLE DATA RECORDER**

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

Software shall be provided to allow the fire department to collect the data as needed.

### **INTERIOR**

The cab interior shall be finished in gray Durawear on the full front and rear headliners and rear firewall.

### **LIGHTING CAB EXTERIOR**

Exterior lighting and reflectors shall meet or exceed Federal Motor Vehicle Safety Standards and National Fire Protection Association requirements in effect at this time.

### **HALOGEN HEADLIGHTS**

There shall be dual sealed beam halogen rectangular headlights in custom housings on each side of the front of the cab.

## **LIGHTING CAB INTERIOR**

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

## **LIGHTING CREW CAB INTERIOR**

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

## **MIRRORS**

Two (2) Lang Mekra 300 Series chrome plated Aero style main and convex mirrors shall be installed on each side of the vehicle. The main mirror shall be 4-way remote adjustable 7" x 16" 2nd surface chromed flat glass. The convex shall be, 6" x 8" 2nd surface chromed 400 mm radius glass. Each mirror housing assembly shall be constructed of lightweight textured chrome ABS with on truck glass and housing back cover replacement. In the event the mirror breaks the glass shall be replaceable in (3) minutes or less. The glass shall include a safety adhesive backing to keep broken glass in place. The mirror assembly shall be supported by a "C" loop bracket constructed of polished stainless steel tube utilizing two point mounting reducing vibration of mirror glass during normal vehicle operation. The lower section of the holder shall include a spring loaded single detent position 20 degrees forward with easy return to operating position without refocusing.

## **HELMET STORAGE**

A universal style helmet bracket shall be provided for each riding position.

A placard shall be provided for each riding position warning that injury may occur if helmets are worn while seated.

## **SEAT BELT WARNING SYSTEM**

An Akron / Weldon seat belt warning system shall be provided, and shall monitor each seating position. Each seat shall be supplied with a sensor that, in conjunction with the display module located on the dash, shall determine when the seat belt was fastened and if the seat is occupied. An icon shall represent that the seat is properly occupied.

An audible and visual alarm shall be activated if the seat is occupied and/or the belt is not fastened in the proper sequence.

### **DRIVER'S SEAT**

The driver's seat shall be a Bostrom Sierra FX air ride high back, adjustable fore/aft, upholstered with gray tweed Durawear. A 3-point seat belt shall be provided.

### **OFFICER'S SEAT**

The officer's seat shall be a Bostrom Firefighter™ Tanker 450 ABTS SCBA seat. The seat shall have the following features:

- Integrated 3-point seat belt
- "Auto-Pivot & Return" head rest
- Built in lumbar support
- 100% Durawear™ gray tweed seat material

### **UNDER SEAT STORAGE**

There shall be a storage compartment under the officer's seat approximately 15" wide x 10.5" tall x 15.5" deep.

### **CREW SEATS**

The crew cab area shall have two (2) Bostrom Firefighter™ seats. The seating arrangement shall be: two (2) rear facing Bostrom Tanker 450 ABTS SCBA seats. The seats shall have the following features:

- Integrated 3-point seat belts
- "Auto-Pivot & Return" head rest
- Built in lumbar support
- 100% Durawear™ gray tweed seat material

There shall also be two forward facing seats (drop down) with seat belts, Bostrom model #ziamatic SE-FCC.

### **SCBA CAVITY PAD**

A removable upholstered pad shall be provided to cover the crew seat SCBA cavities.

## **SCBA BOTTLE BRACKET**

The officer and crew seats shall come equipped with an H.O. Bostrom SecureAll™ SCBA Locking System capable securing all U.S. and international SCBA brands and sizes while in transit or for storage on fire trucks.

Locking shall be achieved by pushing the SCBA unit (bottle) against the pivot arm to engage the automatic lock system. A top clamp shall surround the top of the SCBA tank for a secure fit in all directions. The bracket shall be equipped with a center guide fork to keep the tank in-place for a safe and comfortable fit in seat cavity.

All adjustment points shall utilize one tool and be easily adjustable.

The bracket system shall be free of straps and clamps that may interfere with auxiliary equipment on SCBA units.

The release handle shall be integrated into the seat cushion for quick and easy release and shall eliminate the need for straps or pull cords to interfere with other SCBA equipment.

The bracket system shall meet NFPA 1901 standards and requirements of EN 1846-2.

## **CREW SEAT COMPARTMENT**

A compartment shall be provided under the forward facing crew seats on the back wall of the cab. The compartment shall be full through, with an access door on each side, accessible from the side of the crew cab doors.

## **STEERING**

Ross heavy duty Model TAS-85 power steering shall be provided. The steering gear shall be bolted to the frame at the cross-member for steering linkage rigidity. Four (4) turns from lock to lock with an 18" diameter slip resistant rubber covered steering wheel. Steering column shall have six-position tilt and 2" telescopic adjustment. The cramp angle shall be 45 degrees with 315mm tires or 43 degrees with 425mm tires providing very tight turning ability.

## **SUSPENSION (FRONT)**

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

## **ENHANCED FRONT SUSPENSION SYSTEM**

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

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

A (3) three year 36,0000 mile warranty shall be provided by the manufacturer.

## **SUSPENSION (REAR) 24,000 LB SPRING**

A Reyco model 14514-01 rear spring suspension shall be provided. The rear semi-elliptic springs shall be 37-1/4" x 3 x 8 leaf with trailing arms. The trailing arms allow free movement of the axle from bump loads and deflections while holding the axle in chassis alignment. This suspension shall control axle wrap-up torque caused by accelerating or braking. The trailing arms shall be mounted in maintenance free rubber bushings at both ends. The left arm shall be adjustable in length for maximum accuracy of chassis alignment.

## **TIRE PRESSURE MONITOR**

A Real Wheels LED tire pressure sensor shall be provided for each wheel. The pressure sensor shall indicate if a particular tire is not properly inflated. A total of six (6) indicators shall be provided.

## **FRONT TIRES**

Front tires shall be Goodyear 315/80R22.5, load range J, G291 highway tread, single tubeless type with a GAWR of 18,000 pounds. Wheels shall be disc type, hub piloted, 22.5 x 9.00 10 stud 11.25 bolt circle. Chrome plated lug nut caps shall be provided.

## **FRONT HUB COVERS**

Polished stainless steel hub covers shall be provided for the front axle.

## **REAR HUB COVERS**

Polished stainless steel hub covers shall be provided for the rear axle.

## **REAR TIRES**

Rear tires shall be Goodyear 12R22.5, load range H, G124 Mud and Snow tread, dual tubeless type with a GAWR of 24,000 pounds. Wheels shall be disc type, hub piloted, 22.5 x 8.25 10 stud with 11.25" bolt circle. Chrome plated lug nut caps shall be provided.

## **MUD FLAPS**

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

## **WHEELS**

Aluminum wheels shall be provided for the front and for the inside and outside of the rear wheels. The aluminum wheels shall match the tire and axle capacities of the apparatus.

## **TOW EYES (Front)**

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

## **TOW EYES (Rear)**

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

## **TRANSMISSION**

The chassis shall be equipped with a Generation IV Allison EVS3000 six (6) speed automatic transmission. It shall be programmed five (5) speed, sixth gear locked out, for fire apparatus vocation, in concert with the specified engine.

An electronic oil level indicator shall be provided as well as a diagnostic reader port connection. The fifth gear shall be an overdrive ratio, permitting the vehicle to reach its top speed at the engine's governed speed. The dipstick is dipped in a rubber coating for ease in checking oil level when hot.

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

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

Mechanical Ratios:	1st -	3.51:1
	2nd -	1.91:1
	3rd -	1.43:1
	4th -	1.00:1
	5th -	0.74:1
	Reverse -	-5.00

### **TRANSMISSION COOLER**

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

### **TRANSMISSION FLUID**

The transmission shall come filled with Castrol TranSynd™ Synthetic Transmission Fluid or approved equal meeting the Allison TES-295 specification. **NO EXCEPTION.**

### **TRANSMISSION SHIFTER**

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

### **FRONT TURN SIGNALS**

There shall be two Whelen 400 Series LED rectangular amber turn signal lights mounted one each side in the front of the headlight housing and one mounted on each side of the warning light housing.

### **WHEELBASE**

The wheelbase shall be approximately 165 inches.

## **WINDSHIELD WIPERS**

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

## **MISCELLANEOUS CHASSIS EQUIPMENT**

Fluid capacity plate affixed below driver's seat.

Chassis filter part number plate affixed below driver's seat.

Maximum rated tire speed plaque near driver.

Tire pressure label near each wheel location.

Cab occupancy capacity label affixed next to transmission shifter.

Do not wear helmet while riding plaque for each seating position.

NFPA compliant seat belt and standing warning plates provided.

## **FIRE PUMP HALE QMAX-150**

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

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

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

All moving parts in contact with water shall be of high quality bronze or stainless steel. Easily replaceable bronze labyrinth wear rings shall be provided. Discharge passage shall be designed to accomplish uniform pressure readings as the actual pump pressure. The rated capacity of the fire pump shall be 1500 gallons per minute in accordance with NFPA# 1901.

The pump shaft shall be rigidly supported by three bearings for a minimum deflection. One high lead bronze sleeve bearing shall be located immediately adjacent to the

impeller (on side opposite the drive unit). The sleeve bearing shall be lubricated by a force fed, automatic lubrication system, pressure balanced to exclude foreign material. The remaining bearings shall be heavy-duty type, deep groove ball bearings and shall be splash lubricated.

The pump shaft shall have only one packing gland located on the inlet side of the pump. It shall be of split design for ease of repacking. The packing gland must be a full circle threaded design to exert uniform pressure on the packing to prevent "cocking" and uneven packing load when it is tightened. It shall be easily adjustable by hand with a rod or screwdriver and requiring no special tools or wrenches. The packing rings shall be of a unique combination of braided graphite filament and braided synthetic packing and have sacrificial zinc foil separators to protect the pump shaft from galvanic corrosion.

### **PUMP TRANSFER CASE**

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

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

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

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

### **PRIMING SYSTEM**

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

## **PUMP CERTIFICATION**

The pump, when dry, shall be capable of taking suction and discharging water in compliance with NFPA #1901 chapter 14. The pump shall be tested by National Testing and shall deliver the percentages of rated capacities at pressures indicated below:

- 100% of rated capacity @ 150 PSI net pump pressure.
- 70% of rated capacity @ 200 PSI net pump pressure.
- 50% of rated capacity @ 250 PSI net pump pressure.

## **THREAD TERMINATION**

National Standard Thread shall terminate the inlets and outlets of the apparatus.

## **DIESEL AUXILIARY PUMP**

Hale HPX100-BD26 Diesel Powered Auxiliary Pump (4-cycle diesel Briggs and Stratton Vanguard series DM950D radiator liquid cool design) to be installed in dunnage area. Exact location and plumbing to be determined at preconstruction.

Main Pump/Auxiliary Pump valving and priming to be discussed at preconstruction.

Auxiliary pump shall be grounded with a braided ground strap.

All auxiliary pump manuals must be supplied to the Town upon delivery of the fire apparatus.

## **PRESSURE GOVERNOR**

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

Programmable presets for RPM and Pressure settings shall be easily configurable using the menu structure.

Engine RPM, system voltage, engine oil pressure and engine temperature with audible alarm output for all shall be provided.

## **INTAKE RELIEF**

There shall be a Hale stainless steel intake relief valve installed on the intake side of the pump. The surplus water shall be discharged away from the pump operator and terminate with Male NST hose thread. System is field adjustable.

## **AUXILIARY COOLER**

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

## **VALVES**

All valves shall be Akron Heavy-Duty swing out 8800/8600 series unless otherwise noted. The valve shall have an all cast brass body with flow optimizing stainless steel ball, and dual polymer seats. The valve shall be capable of dual directional flow while incorporating a self-locking ball feature using an automatic friction lock design and specially designed flow optimizing stainless steel ball. The valve shall not require the lubrication of seats or any other internal waterway parts, and be capable of swinging out of the waterway for maintenance by the removal of six bolts. The valve shall be compatible with a slow close device. This valve shall be actuated using manual handles, a Rack & Sector, manual gear, or electric actuator. The manual handles shall be quickly adjustable to one of eight handle positions, and require only 90 degrees travel.

## **VALVE WARRANTY**

The valves shall carry a 10-year warranty.

## **PUMP CONNECTIONS**

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

## **6" PUMP INLETS**

Two 6" diameter suction ports with 6" NST male threads shall be provided, one on each side of vehicle. The inlets shall extend through the side pump panels and come complete with removable strainer and long handle chrome-plated cap.

## **INTAKE VALVE**

A Hale Master Intake valve shall be installed on the main pump inlet on engineer's side. It shall be electrically actuated from the pump panel and include a manual override hand wheel on the pump panel. The valve shall include a pressure relief valve to guard against incoming pressure surges.

## **2.5" RIGHT SIDE INLET**

One 2.5" gated inlet valve shall be provided on the right side pump panel. The valve shall be supplied with chrome plate female swivel, plug, chain, and removable strainer.

The valve shall attach directly to the suction side of the pump with the valve body behind the pump panel.

## **2.5" LEFT SIDE INLET**

One 2.5" gated inlet valve shall be provided on the left side pump panel. The valve shall be supplied with chrome plate female swivel, plug, chain, and removable strainer.

The valve shall attach directly to the suction side of the pump with the valve body behind the pump panel.

## **FRONT INLET**

A 6" front inlet, with chrome long handle cap, shall be provided. The inlet pipe shall be constructed of 5" stainless steel pipe. An air bleeder line shall be provided to eliminate trapped air. The valve shall be a 5" electric operated butterfly valve. The valve operator shall be adjusted to operate in a slow close fashion to eliminate the possibility of water hammer. A switch located on the pump control panel shall activate the valve.

## **TANK TO PUMP**

The booster tank shall be connected to the intake side of the pump with a 1/4 turn 3" full flow valve with check valve, with the remote control located at the operator's panel. The 3" tank to pump line shall run from a bottom sump into the 3" valve. To prevent damage

due to chassis flexing or vibration, a short 3" flexible rubber hose coupling shall be used to connect the tank to the intake valve.

## **OUTLETS**

The discharge valves shall be an inline Tork-Lock constructed of brass and be of the quarter turn type of fixed pivot design to allow for ease of operation at all pressures. The valves shall be controlled from the operator's panel and shall be equipped with swing type locking handles. Each valve shall be supplied with 2-1/2" National Standard Threads and come with chrome plated female caps and chains. 2-1/2" or larger discharge outlet shall be supplied with a 3/4" quarter turn drain valve located at the outlet. All 2-1/2" and larger discharges shall be supplied with a 30 degree angle down elbow.

### **2-1/2" LEFT SIDE DISCHARGE**

One (1) 2-1/2" gated discharges shall be located on the left side pump panel. The valves shall be of the quarter turn tork-lok ball type of fixed pivot design to allow for ease of operation at all pressures. The valve shall be connected to the discharge side of the pump with the valve bodies behind the pump panel. A chrome swing type handle located on the pump operator's panel shall control the side discharges.

### **2-1/2" RIGHT SIDE DISCHARGES**

Two (2) 2-1/2" gated discharges shall be located on the right side pump panel. Each valve shall be of the quarter turn tork-lok ball type of fixed pivot design to allow for ease of operation at all pressures. Each valve shall be connected to the discharge side of the pump with the valve bodies behind the pump panel. Chrome swing type handles located on the pump operator's panel shall control the right side discharges.

### **2.5" OUTLET LEFT REAR**

There shall be a 2.5" gated outlet piped to the left rear, adjacent to the hose bed. The outlet shall be installed with proper clearance for spanner wrenches or adapters. Plumbing shall be 2.5" piping and a full flow 2.5" ball valve with the control at the pump operator's panel.

### **2.5" REAR OUTLET**

There shall be a 2.5" gated outlet piped to the right rear, adjacent to the hose bed. The outlet shall be installed with proper clearance for spanner wrenches or adapters.

Plumbing shall be 2.5" piping and a full flow 2.5" ball valve with the control at the pump operator's panel.

### **1.5" REAR OUTLET**

There shall be a 1.5" gated outlet piped to the right rear, adjacent to the hose bed. The outlet shall be installed with proper clearance for spanner wrenches or adapters. Plumbing shall be 2" piping and a full flow 2" ball valve with the control at the pump operator's panel.

### **2.5" OUTLET RIGHT HOSE BED**

There shall be a 2.5" gated outlet piped to the right front of the hose bed. The outlet shall be installed with proper clearance for spanner wrenches or adapters. Plumbing shall be 2.5" piping and a full flow 2.5" ball valve with the control at the pump operator's panel.

### **FRONT BUMPER DISCHARGE**

A 1.5" discharge with 2" plumbing shall be provided at the front bumper. The valve shall be remote controlled at the pump panel.

### **DELUGE RISER**

A 3" deluge riser shall be installed above the pump in such a manner that a monitor can be mounted and used effectively. Piping shall be rigidly braced. The riser shall be gated and controlled from the pump operators panel.

### **MONITOR NOZZLE**

An Akron Model #3479 electric monitor, which is compact, lightweight and is of rugged pyrolite construction, shall be provided complete with Akromatic Model 5058 nozzle. The monitor shall have controls at the pump panel area.

The monitor shall be capable of flowing 1000 gpm, as well as capable of the following functions separately or simultaneously;

1. 90 degree horizontal sweep.
2. 120 degree vertical sweep.
3. Change water spray pattern from fog to straight strea

### **EXTEND-A-GUN**

A Task Force Tips Extend-A-Gun model XG18 shall be provided and installed. The unit shall allow the deck gun monitor to extend 18”.

### **CROSSLAYS**

Two (2) crosslay hose beds shall be supplied. The piping and valves shall be 2", the swivel shall be 1.5". The valves shall be the "drop-out" style, push/pull controlled from the pump panel.

Each compartment shall hold 200 ft. of 1.75" double jacket hose. Both beds shall be of the same dimension.

### **CROSSLAY COVER**

The crosslays shall be fitted with an .125" aluminum cover. The cover shall have a stainless steel hinge and flaps on the sides capable of being securely fastened.

### **TANK FILL**

A 2" tank fill line shall be provided, using a quarter turn full flow ball valve controlled from the pump operator's panel.

### **FOAM TANK**

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

### **FOAM SYSTEM**

The apparatus shall be equipped with a FoamPro 2001 electric, fully automatic, variable speed, discharge side foam proportioning system. The system shall be capable of handling class A and most types of class B foam. The system shall be equipped with a 12-volt electric motor driven positive displacement foam concentrate pump, rated up to 2.6 gpm, with operating pressures up to 400 psi.

A digital computer control display shall be provided and display shall include the following functions:

- Push-button control of foam proportioning foam
- Current flow-per-minute of water
- Volume of water discharged
- Flow rate simulation

- Set-up and diagnostic functions
- "Low Concentrate" warning light
- "No Concentrate" warning light

The foam shall be plumbed to the 1-1/2" crosslays.

### **PUMP AND GAUGE PANELS**

The panels shall be constructed of black vinyl covered aluminum for maximum protection against abrasion caused during normal use. The pump and gauge panels shall be flush mounted on the aluminum extruded pump module framework.

Pump panels on both sides shall be easily removable. The gauge and control panels shall be two separate panels for ease of maintenance. The upper gauge panel shall be hinged with a full-length stainless steel hinge held closed with a 1/4-turn latch. There shall be one (1) hinged access door as large as possible located over the right side pump panel. This door shall have a full-length stainless steel hinge and a 1/4 turn latching mechanism.

### **VALVE CONTROLS**

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

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

### **ESCUTCHEON PLATES**

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

### **COLOR CODING**

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

- #1 Discharge - Yellow
- #2 Discharge – White
- #3 Discharge – Navy Blue
- #4 Discharge - Black
- #5 Discharge - Green
- #1 Pre-Connect - Orange

#2 Pre-Connect - Red  
#3 Pre-Connect - Brown  
#4 Pre-Connect - Magenta  
Front Bumper Line - Turquoise  
Large Diameter Discharge – Yellow With White Border  
Left Hose Bed Pre-Connect - Tan  
Right Hose Bed Pre-Connect - Lavender  
Left Rear Discharge - Olive  
Right Rear Discharge – Light Blue  
Deck Gun – Silver  
Inlets – Burgundy  
Tank fill Lime Green  
Tank to Pump - Burgundy

### **PUMP PANEL LIGHTS**

The pump panel controls and gauges shall be illuminated by a minimum of two (2) incandescent lights.

### **PUMP PANEL GAUGES AND CONTROLS**

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

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

### **4" MASTER GAUGES**

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

### **2.5" PRESSURE GAUGES**

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

## **WATER TANK GAUGE**

Water tank gauge shall be replaced with a sight tube. Specific design and placement to be determined at preconstruction.

## **CLASS A FOAM TANK LEVEL GAUGE**

A Fire Research TankVision® model WL2600 foam tank volume indicator kit shall be installed. The kit shall include an electronic indicator module, a pressure sensor, and sensor cable. The indicator shall show the volume of Class A foam in the tank on nine (9) easy to see super bright LEDs. A wide view lens over the LEDs shall provide for a viewing angle of 180 degrees. The indicator case shall be waterproof and manufactured of aluminum.

The program features shall be accessed from the front of the indicator module. The program shall support self-diagnostics capabilities, self-calibration, and a datalink to connect remote indicators. Low water warnings shall include flashing LEDs at 25%, down chasing LEDs when the tank is almost empty.

The indicator shall receive an input signal from an electronic pressure sensor. The sensor shall be mounted on the outside of the water tank near the bottom; no probe shall be placed on the interior of the tank. Wiring shall be weather resistant and have automotive type plug-in connectors.

The gauge shall be located on the pump operator's panel.

## **BODY SUB-FRAME**

The chassis shall be fitted with a sub-frame system consisting of a series of steel plate gusseted legs, extending down and out from the chassis frame rails on each side. This system shall provide additional structural support to the running boards and side compartments. A heavy-duty rear platform shall be constructed of the same material to support the rear compartments and rear step. The entire assembly shall be attached to the chassis frame by a series of heavy-duty U-bolts. Self-supporting bodies shall not be acceptable. **NO EXCEPTIONS**

The entire subframe assembly shall be painted to match the chassis frame color.

## **APPARATUS BODY**

The body shall be constructed of 3/16" #5052 aluminum sheet, #3003 bright aluminum diamond plate and structural aluminum extrusions. The body shall be of the modular design to allow for proper flexing of the truck chassis. The body shall be custom built

and engineered for proper load distribution on the chassis. An insulator material shall be used where aluminum and steel are in contact to prevent corrosion.

The ceilings, sidewalls and floors of the body compartments shall be constructed of 3/16" 5052-H32 smooth aluminum plate with a tensile strength range of 32,000 to 44,000 psi. Continuous 5356 fill welding shall seal compartment panels.

The body framework shall be constructed of custom-designed aluminum alloy 6063-T5 extrusions with a tensile strength of 35,000 psi.

To eliminate "dead space" and to maximize compartment interior space, there shall be no more than 1/4" between outer and inner walls.

The compartment extrusions shall be slotted full-length on backside for uniform fitting of the aluminum plate work that forms the compartment interiors.

The aluminum extrusion profiles shall incorporate 1" x 1-3/4" recessed continuous door seal at the bottom of the compartment. The extrusions shall be designed to allow unobstructed, sweep-out floors in all compartments.

The front, top, and rear surfaces of body shall be covered with .125" bright aluminum diamond treadplate. The forward and rear recessed surfaces shall be flush with the corner extrusions.

The compartment tops shall extend downward over the extrusions and form a drip molding. The material shall be .125 aluminum treadplate with approved aerated service for walking.

The compartment assemblies are to be fastened to the sub-frame with mechanical Huck-type bolts.

The apparatus body shall be a separate module from the pump enclosure and shall not be fastened together in any manner.

Each compartment shall be properly vented with louvers.

### **REAR STEP COMPARTMENTATION**

There shall be one full width compartment at the rear step 74" wide x 30" high (depth to be determined prior to preconstruction)

### **COMPARTMENTATION LEFT SIDE**

L1- A compartment shall be provided ahead of the rear wheels approximately 22" wide x 27-1/2" high x 29" deep.

- L2,L3 There shall be two compartments with lift up doors above the side fender compartments each approximately 32" high x 12" deep x 54-1/4" wide inside.
- L4- A compartment shall be provided behind the rear wheels approximately 33" wide x 27-1/2" high, full through, and accessible from the rear.
- L5- There shall be a second compartment behind the rear wheels approximately 16" wide x 61-1/4" high x 12" deep inside.

### **COMPARTMENTATION RIGHT SIDE**

- R1- A compartment shall be provided ahead of the rear wheels approximately 22" wide x 27-1/2" high x 29" deep.
- R2,R3 There shall be two compartments with lift up doors above the side fender compartments each approximately 32" high x 12" deep x 54-1/4" wide inside.
- R4- A compartment shall be provided behind the rear wheels approximately 33" wide x 27-1/2" high, full through, and accessible from the rear.
- R5- There shall be a second compartment behind the rear wheels approximately 16" wide x 61-1/4" high x 12" deep inside.

### **COMPARTMENT DOORS**

The compartment doors shall be box pan construction. The outer door skin shall be .190" 5052-H32 aluminum. The inner pan shall be .125" 5052-H32 aluminum securely welded to the outer skin. A hat section channel shall be installed in the center of the door to stabilize the door pan and to deaden the sound when closing the door. The doors shall have double latches. Access cover plates shall be provided to service latch mechanisms. The door edge shall be 7/16" thick providing ample strength for the attachment of the door hinge. The door hinge shall be polished stainless steel .075" thick with a 3/16" diameter pin and 1" long knuckles. The hinge shall be attached using 1/4" truss head stainless steel bolts spaced 5" apart. The door shall be of the double seal design incorporating an inner and outer "D" shaped extruded rubber automotive seal to provide a tight seal at each compartment.

Flush mounted chrome plated bent "D" ring door handles; single point positive type latches with adjustable catches (slam type door catches) shall be provided on all compartments. Gas strut cylinder arms shall be mounted on each swing out compartment door.

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

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

### **DOOR LOCKS**

The compartment doors shall be equipped with locks. The locks shall all be keyed alike.

### **SCBA CYLINDER COMPARTMENTS**

There shall be four (4) spare breathing air cylinder compartments recessed in the rear fender wells, two (2) left and two (2) right. The compartments shall have brushed stainless doors equipped with a weather resistant flush fitting thumb latch. The interior of the door shall incorporate a rubber seal to keep the compartment free of road debris and moisture. The interior compartment shall be constructed of a high-density polyethylene plastic.

### **ADJUSTABLE SHELVES**

There shall be two (2) adjustable shelves provided and installed in front upper officer's side compartment. The shelves shall be fabricated of .188" aluminum plate.

### **UNISTRUT**

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

### **HOSE BED**

The hose bed shall be provided with aluminum slatted flooring radiused at the edges to prevent hose damage from sharp edges. Each hose bed floor section shall be removable for easy access to the water tank.

Hose layout from engineer's side to officer's side:

200' of 1.50" -- single stack/row

200' of 1.50" -- single stack/row

750' of 3.00"

750' of 3.00"

200' of 1.75" -- single stack/ro

## **HOSE BED DIVIDER**

The hose bed shall be divided by five (5) 3/16" aluminum partitions that are fully adjustable by sliding in tracks located at the front and rear of the hose bed. The dividers shall be located as directed at the pre-construction meeting.

## **HOSE BED COVER**

An aluminum two-piece, hinged hose bed cover constructed of .125" aluminum diamond plate and square aluminum extrusion shall be provided for the main hose bed.

## **BODY HANDRAILS**

Handrails shall be constructed of 1-1/4" diameter knurled anodized aluminum 3/8" heavy wall extrusion. The handrail shall be mounted utilizing chrome stanchions, which shall provide sufficient space to allow for a gloved hand to grip the rail. The rails shall be located in the following areas:

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

There shall be one (1) 30" vertical handrail at rear of the body one each side of the rear compartment.

There shall be two (2) handrails mounted horizontally, above the pump panel, one (1) on each side as large as possible.

## **STEPS**

There shall be fold-down steps mounted on each side of the front face of body to provide access to the top of the pump module and dunnage area.

The rear of the body shall be equipped with fixed steps. The bottom step shall measure 14" x 11" to provide a stable footing position. Each additional step above shall measure 14" x 8" for clearance while climbing. Thinly fabricated aluminum steps shall not be utilized.

The quantity and location of steps and handrails shall meet the Current NFPA 1901 pamphlet in effect at the time the apparatus is ordered.

An additional folding step shall be provided on the rear engineer's side above the fixed step.

## **RUB RAILS**

The body shall be equipped with anodized aluminum channel style rub rails at the sides. Rub rails shall be spaced away from the body by 1/2" polymer spacers. The rub rails shall be polished to a bright finish.

## **ALUMINUM TREADPLATE**

All load bearing aluminum treadplate running boards shall be .155 thick bright-annealed finish. Running boards and rear step edges shall be flanged down for added strength. Running boards shall also be flanged up to form kick plates. All non-load bearing aluminum shall be .125" thick bright annealed finish. In areas where aluminum treadplate shall function as a load-bearing surface, there shall be a heavy steel sub-structure. This structure shall consist of 3" channel and 1-1/2" angle welded support. This shall assure that there shall be no flexing or cracking of running boards. The aluminum shall be insulated from the steel by closed cell foam body barrier material.

Treadplate locations:

1. Skirting around front bumper.
2. The step at the cab entrance.
3. The jump seat steps.
4. The body header.
5. The running boards.
6. The rear step.
7. The top of the compartments.
8. The rear of the apparatus.
9. The rear fenders.

## **RUNNING BOARD TROUGH**

A trough shall be provided in the left side running board to hold a 25 feet of 3" suction hose. Velcro straps shall be provided to secure the hose.

## **RUNNING BOARD TROUGH**

A trough shall be provided in the right side running board to hold 25 feet of 3" suction hose. Velcro straps shall be provided to secure the hose.

## **PAINTED REAR FENDER PANELS**

Aluminum rear treadplate fender panels shall be replaced with smooth rear fender panels, and shall be painted body color.

## **BOOSTER TANK**

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

The tank shall be constructed of 1/2" thick polypropylene sheet stock. This material shall be a non-corrosive stress relieved copolymer thermo-plastic and U.V. stabilized for maximum protection. The booster tank shall be of a specific configuration and is so designed to be completely independent of the body and compartments. All joints and seams shall be welded and/or formed and tested for maximum strength and integrity. The top of the booster tank is fitted with removable lifting eyes designed with a 3 to 1 safety factor to facilitate easy removability. The transverse swash partitions shall be manufactured of 3/8" polypropylene and extend from approximately 4" off the floor to just under the cover. The longitudinal swash partitions shall be constructed of 3/8" polypropylene and extend from the floor of the tank through the cover to allow for positive welding and maximum integrity. All partitions shall be equipped with vent and air holes to permit movement of air and water between compartments. The partitions shall be designed to provide maximum water flow. All swash partitions interlock with one another and are welded to each other as well as to the walls of the tank.

The tank shall have a combination vent and manual fill tower. The fill tower shall be constructed of 1/2" polypropylene and shall be a minimum dimension of 8" x 8" outer perimeter. The tower shall be located in the left front corner of the tank. The tower shall have 1/4" thick removable polypropylene screen and a polypropylene hinged-type cover. The tank cover shall be constructed of 1/2" thick polypropylene to incorporate a multi three-piece locking design which allows for individual removal and inspection if necessary.

The sump shall be constructed of 1/2" polypropylene and be located in the left front quarter of the tank. The sump shall have a minimum of 3" national pipe threaded outlet on the bottom for a drain plug. This shall be used as a combination clean-out and drain. All tanks shall have a anti-swirl plate located approximately 2" above the sump.

All tank fill couplings shall be backed with flow deflectors to break up the stream of water entering the tank.

The tank shall rest on the body cross members in conjunction with such additional cross members, spaced at a distance that would not allow for more than 530 square inches of unsupported area under the tank floor.

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

## **BOOSTER REEL AND EQUIPMENT**

One (1) bright aluminum electric rewind compact/narrow style booster reel with sealed joints, leak proof ball bearings, and an adjustable friction brake. The reel shall have a heavy frame to keep the drum, bearings, and rewind mechanism in alignment at all times. The reel shall have roller guides to prevent hose damage while it is being taken on and off of the reel. The electric rewind shall be located for convenience and safety of operation. Positive rewind power shall be assured by the use of sprocket and chain in conjunction with a geared manual crank.

The reel shall be located in the dunnage area, and shall be equipped with 100 ft. of 3/4" best grade booster hose and a 30 gpm nozzle mounted in a tulip bracket.

Booster Reel retract button located on inside of top rail (exact position determined at preconstruction).

## **ELECTRIC SYSTEM**

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

All external harness interfaces shall be of a triple seal type connection to ensure a proper connection. The cab/chassis and the chassis/body connection points shall be mounted in accessible locations. Complete chassis wiring schematics shall be supplied with the apparatus.

The wiring harness contained on the chassis shall be designed to utilize wires of stranded copper or copper alloy of a gauge rated to carry 125% of maximum current for which the circuit is protected without exceeding 10% voltage drop across the circuit. The wiring shall be uniquely identified by color code or circuit function code, labeled at a

minimum of every three (3) inches. The identification of the wiring shall be referenced on a wiring diagram. All wires conform to SAEJ1127 (Battery Cable), SAEJ1128 (Low Tension Primary Cable), SAEJ1560 (Low Tension Thin Wall Primary Cable).

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

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

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

### **BACK-UP ALARM**

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

A rear back up camera shall be provided. The location of this equipment will be discussed at the pre-construction meeting. Integration into the MDC will also be required.

### **COMMUNICATION SYSTEM**

A five position Set Comm system shall be provided in the cab. The five positions include: driver, officer, two crew seats and pump panel. The driver, officer and pump panel positions shall be interfaced with radio. The Town has worked with Set Comm representatives already and the bidder is directed to Set Comm to coordinate equipment and associated costs.

### **COMPARTMENT LIGHTING**

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

### **LICENSE PLATE BRACKET**

A license plate bracket shall be provided at the rear of the apparatus. A Weldon Technologies light part # 9186-23882-30 shall be mounted directly above the license plate area for proper illumination.

### **TAIL/STOP/TURN LIGHTS**

The taillights are to be Whelen 600 LED style. The brake/tail lights to be red and exceed SAE requirements. The turn signal shall be populated in an arrow pattern, amber in color. The backup lights are to be halogen. One opening shall be open to accept a 600 series warning light.

### **LED ICC/MARKER LIGHTS**

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

### **STEP LIGHTS**

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

One Weldon 2631 LED shall be mounted under each step on the rear of the body to illuminate the tailboard and the steps.

### **GROUND LIGHTING**

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

### **WORK LIGHTS**

Two (2) Collins FX-12 chrome plated halogen beam lights full 360-degree rotation in either direction with individual switch. The lights shall be mounted on top of the rear hose body stanchions.

## **GO-LIGHT**

One (1) Go-Light, model 5167, to be mounted in front of light bar in the center of the roof. Go-Light controlled by one (1) dash mounted control or one (1) wireless remote. Dash mounted control accessible to driver.

## **OPTICAL WARNING SYSTEM**

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

A master optical warning device switch shall be provided to energize all of the optical warning devices provided. All lights shall operate at not less than the minimum flash rate per minute as specified by NFPA.

## **UPPER LEVEL WARNING DEVICES**

The upper level is divided into zones A, B, C and D and the approved lighting package to be provided shall be as follows:

Zone A (front) shall have one (1) Whelen Freedom 72" Model FN72QLED NFPA 1901 compliant light bar, with eight (8) LED modules. The light bar shall have six (6) red LED and two (2) clear LED heads and shall be mounted on the cab roof.

A separate opticom optimizer with separate control switch shall also be provided.

Zone B (right side) shall be covered by the module from the light bar and the right rear stanchion beacon.

Zone C (rear) shall have two (2) Whelen Model RB6 rotating beacons, red, mounted on rear stanchions.

Zone D (left side) shall be covered by the module from the light bar and the left rear stanchion beacon.

## **WHELEN MINI LED LIGHTBARS**

There shall be two (2) Whelen Model FNMINI Mini Freedom series LED light bars provided and mounted above the driver and officer doors. These lights shall be wired to a dash mounted switch.

The rear beacons shall be upgraded to Whelen B6MM LED beacons. Deflectors shall be mounted on forward side to prevent flash in mirrors.

### **LOWER LEVEL WARNING DEVICES**

The lower level is divided into zones A, B, C and D and the approved lighting package to be provided shall be as follows:

Zone A (front) shall have a stainless steel warning light housing each side with two (2) Whelen 600 Super LED red lights mounted in the front of each housing. The inboard pair of lights is in addition to the minimum NFPA warning system and shall be wired through a load-shedding device.

Zone B (right side) shall have two (2) Whelen 600 Series Super LED red lights mounted one on the side of the headlight housing and one on the body side at rear of apparatus.

Zone C (rear) shall have two (2) Whelen 600 Series Super LED, red lights mounted one each side of the rear of the apparatus.

Zone D (left side) shall have two (2) Whelen 600 Series Super LED red lights mounted one on the side of the headlight housing and one on the body side at rear of apparatus.

### **SIREN**

One (1) Whelen Model 295 SLSA1 electronic siren shall be installed at the cab instrument panel complete with noise canceling microphone. The horn button in the steering wheel, a switch on right hand side of cab floor and the control on the siren head shall actuate the siren. A floor switch shall be mounted on engineer's side -- no steering wheel button .

Head units to be mounted in order from seft to right: siren, traffic advisor, Kenwood Radio.

A foot switch shall be provided on the driver's side of the cab floor.

### **FEDERAL Q2B SIREN**

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

A siren foot switch shall be provided for both the driver and officer, one on each side of the cab floor.

### **SIREN SPEAKER**

One Cast Products SA4201-5-A weatherproof siren speaker shall be provided, mounted behind the bumper.

### **TELESCOPIC LED LIGHTS**

Fire Research Q14 LED side mount push up telescopic light shall be installed. The light pole shall be anodized aluminum and have a knurled twist lock mechanism to secure the extension pole in position. The extension pole shall rotate 360 degrees. The outer pole shall be a grooved aluminum extrusion and qualify as an NFPA compliant handrail. The pole mounting brackets shall have a 2 3/4" offset. Wiring shall extend from the pole bottom with a 4' retractile cord. Switches to be mounted on center console in cab.

### **SUCTION HOSE AND STRAINER**

Two (2) 10 ft. lengths of 6" lightweight (KOCHEK) fire department hard suction hose with lightweight long handle couplings and pin lug male couplings shall be provided.

The hose shall be mounted in V-shaped troughs and held in position by two heavy-duty quick release straps. Aluminum treadplate scuff plates shall be provided on the body side metal where the long handle couplings would otherwise hit the body sides.

A six-inch strainer especially designed for fire department service. Strainer area equals four and one-half times the area of the hose.

### **GROUND LADDERS**

The apparatus shall be equipped with heavy duty, box type "I" beam rail, ground ladders. The ladders shall meet the requirements of NFPA 1931 to ensure proper design and that sufficient strength is available for the service intended. The ground ladders shall be constructed of aluminum with non-welded, field replaceable rung to rail connections to simplify field repairs and removable plated steel butt spurs for added strength. A full 1/2", non-rotting, poly rope shall be provided for easy ladder operation.

One (1) Alco-Lite PEL-24 24 ft. two-section aluminum extension ladder.

One (1) Alco-Lite PRL-14 14 ft. aluminum roof ladder.

One (1) Alco-Lite FL-10' 10 ft. folding ladder.

The ladders shall have lifetime Warranty against manufacturing defects.

### **LADDER MOUNTING**

The ladders shall be mounted in chute on officer's side of hosebed. Chute to have door at rear.

## **CORROSION REDUCTION POLICY**

The manufacturer shall have in place a formal corrosion reduction program and assembly procedures designed for reducing and eliminating the possibility of corrosion. It is understood that fire apparatus shall operate in harsh environments. At the time of the bid the apparatus manufacturer shall show proof of a corrosion policy. Failure to submit this information could be grounds for rejection. If a formal policy is not in place explain in your bid how your firm shall take the necessary steps for corrosion reduction. There shall be no exception to this requirement.

In addition to a formal program the manufacture shall show proof of testing corrosion reduction processes to ASTM B117. A copy of recent test shall be included in the bid.

### **Frame Rails**

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

### **Electro Plating**

Steel and Iron brackets such as the pump module bracket shall be Zinc plated to protect against corrosion. Plating shall be in accordance with ASTM B663. The apparatus manufacturer shall list all components with plating.

### **Fasteners**

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

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

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

When mounting aluminum components such as a step to the apparatus body. The manufacturer shall use stainless washers with rubber backing. All mounted components shall have a barrier material between the two surfaces.

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

Whenever possible, pre-drill and tap all holes for mounting components such as lights, steps and hand rails prior to the paint process to reduce the corrosion opportunity. If a hole must be drilled into a previously painted surface, re-establish the paint barrier around the hole and use a flange-type nutsert with a gasket under the flange.

Where possible, minimize the number of stainless trim screws in aluminum. Structural tape and or adhesive shall be used where possible for mounting trim to the body or cab.

If a pre-treated screw or bolt is not available, hand apply Dynatex Boltlocker or Threadlocker on the threads of the screw, bolt or nutsert. This shall help seal threads from moisture and help prevent the fasteners from loosening.

If lubricant is used when tapping the hole, clean out the lubricant and the shavings before applying blue Threadlocker into the hole.

### **Barrier Tape**

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

Before applying the tape, be sure the metal surface is clean from oil or dirt by cleaning the surface with a 50/50 mix of alcohol and water or similar solvent.

### **Gaskets**

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

Mounting with Threadlocker coating shall be used.

Flat washers with rubber backing shall be used behind all lights that have stainless screws.

### **Rollup Doors**

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

Use a paint stick around the holes after drilling and tapping. In mounting the rails, use screws with the nylon under the head and Threadlocker on the threads for mounting the doorframes.

Install barrier tape to the painted surface where the trim is located on top of the door opening.

### **Hinged Doors**

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

On the hinge side, mount tape out toward the edge to space over the barrel of the hinge, being sure to not touch the door.

Make sure the hinge fits into the extrusion frame with no corner weld beads interfering with the door fit. Do not put the hinge in a bind or cause the stainless steel hinge to touch the aluminum. Install the doors using a truss head bolt with the nylon coating under the head and Threadlocker on the threads.

### **Painting Steel**

The manufacturer shall wipe any oil residue dry, remove any rust and remove weld slag or smoke. Clean the surface with solvent before painting. Prime with one even coat of black Color primer, and then spray a topcoat over the primer for the finish coat. After bolts are tightened to the proper torque, touch up the bolt area and ends of the bolts with primer or cold galvanizing coating.

### **Mounting Emergency Lights and Options**

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

### **Electrical Grounding**

Grounding straps shall be installed consisting of a minimum 2-gauge strap bolted to the chassis frame.

A ground cable from the cab to the right side frame rail  
From the alternator to the right side frame rail  
From the pump module frame to the right side truck frame.  
Aerials: from the hydraulic and pump module framework.  
From the pump mount to the truck frame rail.  
From the body module to the right side truck frame.

Proper grounding shall help eliminate ground loop problems throughout the truck, reducing the possibility for electrolysis and corrosion to occur. Provide clean connection points on all ground connections, (remove paint where applicable), and spray or brush on electrical sealer as necessary.

When installing foam system pump wiring the power must come from a dedicated breaker to a power solenoid, and then to the power terminal provided by FoamLogix or FoamPro. Pay particular attention to the grounding detail for wire size and good grounding practice, including removing the paint at the point of ground attachment to the chassis. Keep the length of ground wire as short as practically possible.

## **SALT SPRAY TESTING**

Salt spray test shall be used to confirm the relative resistance to corrosion of coated and uncoated metallic specimens, when exposed to a salt spray climate at an elevated temperature. Test specimens shall be placed in an enclosed chamber and exposed to a continuous indirect spray of neutral (pH 6.5 to 7.2) salt water solution, which falls-out on to the specimens at a rate of 1.0 to 2.0 ml/80cm<sup>2</sup>/hour, in a chamber temperature of +35C. This climate shall be maintained under constant steady state conditions.

### **Method**

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

A 5% salt solution, prepared by dissolving sodium chloride into water that meets the requirements of ASTM D1193 Specification for Reagent Water, Type IV is supplied to the chamber. At the time the samples are placed into test, the cabinet should be pre-conditioned to the operating temperature of 35°C and fogging a 5% salt solution at the specified rate. The fog collection rate is determined by placing a minimum of two 80 sq. cm. funnels inserted into measuring cylinders graduated in ml. inside the chamber. One collection device shall be located nearest the nozzle and one in the farthest corner.

### **Orientation**

Unless otherwise agreed upon, the samples are placed at a 15-30 degree angle from vertical or tested in the "installed" position. This orientation allows the condensation to run down the specimens and minimizes condensation pooling. Overcrowding of samples within the cabinet should be avoided. An important aspect of the test is the utilization of a free-falling mist, which uniformly settles on the test samples. Samples should be placed in the chamber so that condensation does not drip from one to another.

### **Test durations**

Test durations shall be 500 hours except for sample rotation and daily monitoring of collection rates, the cabinet should remain closed for the duration of the test.

## **PAINTING**

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

All removable items such as brackets, compartment doors, door hinges, trim, etc. shall be removed and painted separately to insure finish paint behind all mounted items. Body assemblies that cannot be finish painted after assembly shall be finish painted before assembly. Both aluminum and steel surfaces to be painted shall be primed with

a two (2)-component primer which is compatible with the finish coat. The apparatus shall be finish painted with a polyurethane base/clear system. "No Exception"

A barrier gasket/washer of "High Density Closed Cell Urethane Foam" shall be used behind all lights, handrails, door hardware and any miscellaneous items such as stainless steel snaps, hooks, washers and acorn nuts. The gaskets/washers shall be coated with pressure sensitive acrylic adhesive. All screws used to penetrate painted surfaces shall be pre-treated/coated under the head with nylon and the threads shall have pre-coat #80. This procedure shall be strictly adhered to for corrosion prevention and damage to the finish painted surfaces.

The following paint process shall be utilized:

**Surface Preparation:**

1. Wash surface thoroughly with mild detergent.
2. Clean and de-grease with Prep-Sol 3812S.
3. Sand and feather edge using 400 grit or finer on a dual action sander.
4. Remove sanding dust with a cleaner compatible with polyurethane base coat/clear coat final finish.

**Substrate treatment:**

1. Use a Metal Conditioner followed with a Conversion Coating product.

**Priming:**

1. Use a priming 615S pretreatment.
2. Use a self etching primer applied to achieve a 1.5 mil dft minimum.
3. Use Prime N Seal sealer compatible with polyurethane base coat.

**Color Coat:**

1. Apply polyurethane base coat 1-2 mil dft minimum.

**Clear coat:**

1. Apply polyurethane clear coat 2 mil dft minimum.

**PAINT-TWO TONE CAB**

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

Top	Imron Blue 7851X
Bottom	Imron Red F042X

**UNDERCOATING**

Ziebart, or equal, undercoating shall be applied to visible surfaces on the underside of the truck body and chassis to help reduce noise in the cab caused by tires, stones, sand

and water spray. This thick, super-tough coating, being highly abrasion-resistant does not wear off. It also protects underbody components from moisture, mud and salt.

### **ZIEBART WARRANTY**

The application shall come with Ziebart's ten (10) year rust protection limited warranty.

### **LETTERING**

Sixty (60) 3" 22KT Gold laminate goldleaf letters, with left hand shading and right hand outline to equal 3-5/8" letter, shall be provided.

Additional 10" letters shall be provided.

Additional 11" letters shall be provided.

### **AMERICAN FLAG**

There shall be a vinyl American flag overlay on the front grille of the cab.

### **STRIPING**

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

An additional 1" Scotchlite stripe (white) shall be provided above and below the 6" stripe.

### **STRIPING, CHEVRON STYLE, REAR BODY, OUTBOARD**

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

### **MISCELLANEOUS EQUIPMENT FURNISHED**

1 pt. touch-up paint

### **WHEEL CHOCKS**

Two (2) Ziamatic #SAC-44 folding wheel chocks with SQCH-44H holders shall be provided. The wheel chocks shall be located in a area close to the rear axles easily accessible from the side of the apparatus.

## **OPERATION AND SERVICE MANUALS**

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

A video demonstration DVD on the operation of the truck shall be supplied with the manuals.

## **WARRANTIES**

The following warranties shall be supplied:

1. The apparatus shall be warranted to be free from mechanical defects in workmanship for a period of one (1) year. The apparatus shall be covered for parts and labor costs associated with repairs for a period one (1) year.
2. Life-time warranty on the frame.
3. Seven (7) year warranty on paint.
4. Ten (10) body structural warranty
5. Ten (10) year cab structural warranty
6. Manufacturers Warranties for all major components.

## **DELIVERY**

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

## **MANUFACTURING & LOCATIONS**

The apparatus shall be manufactured in facilities wholly owned and operated by the company. A complete stock of service parts, and service shall be provided on a 24 hours around the clock basis. The company shall maintain parts and service for a minimum period of twenty (20) years on each apparatus model manufactured.