INFORMATION FOR CONTRACTORS

Proposals are desired from reputable makers of fire apparatus in accordance with these specifications for the piece of apparatus listed as follows:

1500 GPM Custom Pumper, 1000 gallon water tank, apparatus body, and all other equipment in accordance with the following;

GENERAL REQUIREMENTS

Each bid must be accompanied by bidder's accurate written specifications covering the apparatus and equipment, which it is proposing to furnish and to which the apparatus furnished under the Contract must conform.

It is the intent of these specifications to cover the furnishing and delivery to the purchaser, complete apparatus equipped as specified. All specifications herein contained are considered as minimum. Some items have been specified by brand name or model number. These have been carefully selected because of their reliability, compatibility with present equipment, and local availability of parts.

"As Equal" exceptions to these specifications will be considered relating to the make and model of fire pump, valves and plumbing, gauge and types of materials, size of compartments, methods of construction, and overall design features of the apparatus. Proof that any differences to these specifications as proposed regarding the major components, features, materials, and building practices as specified by the department rests solely with the bidder and may or may not be deemed acceptable alternatives by the department.

Exceptions taken in any area, no matter how small, must be listed on a separate page and marked "Exceptions to the Specifications". Every exception taken shall be listed as to page number and paragraph. Failure to provide the required exception list with the bid proposal will be cause for rejection of that proposal.

Such details and other construction features not specifically covered herein shall conform to all State and Federal requirements, and the NFPA Pamphlet No. 1901 "Standard for Automotive Fire Apparatus" in effect at the time the contract is signed.

Any test equipment required or expense incurred for the ULI pump test shall be borne by the contractor supplying this equipment.

RELIABILITY OF CONTRACTOR

Contractor shall furnish satisfactory evidence that he has the ability to construct the apparatus specified, and shall state in the bid proposal the location of the factory where the apparatus is to be built, and also where future service work will be performed.

Proposals will only be considered which are submitted by full time fire apparatus manufacturers who are current members of the Fire Apparatus Manufacturers Association (FAMA). FAMA is a nonprofit organization designed to keep fire truck manufacturers abreast with latest technologies

and governing standards, and to act as a liaison to the IAFC and NFPA. Bidder must have the ability to show evidence of their affiliation to the FAMA in the bid proposal.

All bidders shall provide with their proposal, pictures of similar apparatus as that being specified, and the names of ten cities where similar apparatus have been furnished.

SUBMISSION OF PROPOSALS

Each proposal shall be submitted in sequence with the attached specifications for ease of checking compliance of bids with bidder's specifications. **NO EXCEPTIONS.**

All proposals shall be submitted on company letterhead.

Each bid proposal shall be signed by an authorized representative of the manufacturing company being bid.

Any proposal which is not signed by a representative of the manufacturing company being bid or not submitted on company letterhead will be immediately rejected.

COMMERCIAL GENERAL LIABILITY INSURANCE

The successful bidder shall, during the performance of the contract and for three (3) years following acceptance of the product, keep in force at least the following minimum limits of commercial general liability insurance:

Each Occurrence	$1,000,000
Products/Completed Operations Aggregate	$1,000,000
Personal and Advertising Injury	$1,000,000
General Aggregate	$2,000,000

Coverage shall be written on a Commercial General Liability form. The policy shall be written on an occurrence form and shall include Contractual Liability coverage for bodily injury and property damage subject to the terms and conditions of the policy. The policy shall include Owner as an additional insured when required by written contract.

COMMERCIAL AUTOMOBILE LIABILITY INSURANCE

The successful bidder shall, during the performance of the contract keep in force at least the following minimum limits of commercial automobile liability insurance:
Each Accident Combined Single Limit: $1,000,000
Coverage shall be written on a Commercial Automobile liability form.

UMBRELLA/EXCESS LIABILITY INSURANCE

The successful bidder shall, during the performance of the contract and for three (3) years following acceptance of the product, keep in force at least the following minimum limits of umbrella liability insurance:

Aggregate:	$15,000,000
Each Occurrence:	$15,000,000
Excess Liability	$10,000,000

The umbrella policy shall be written on an occurrence basis and at a minimum provide excess to the Bidder's General Liability, Automobile Liability and Employer's Liability policies.
The required limits can be provided by one (1) or more policies provided all other insurance requirements are met.
Coverage shall be provided by a carrier(s) rated A- or better by A.M. Bests.
All policies shall provide a 30 day notice of cancellation to the named insured. The Certificate of Insurance shall provide the following cancellation clause: Should any of the above described polices be cancelled before the expiration date thereof, notice shall be delivered in accordance with the policy provisions. Bidder agrees to furnish owner with a current Certificate of Insurance with the coverage listed above along with its bid. The certificate shall show the purchaser as certificate holder.

ISO COMPLIANCE

The manufacturer shall operate a Quality Management System under the requirements of ISO 9001. These standards sponsored by the International Organization for Standardization (ISO) specify the quality systems that shall be established by the manufacturer for design, manufacture, installation and service. A copy of the certificate of compliance shall be included with the bid.

DRAWINGS

A CAD produced line drawing of the exact apparatus being proposed must be furnished with the bid. Since the blueprint drawing is required of all bidders, any bid submitted without a drawing as specified will be considered non-responsive and automatically rejected. Drawing must include the left side with chassis cab, right, and rear views of the vehicle. Drawing must be a minimum of 11” x 17”, and shall be a drawing of the exact apparatus as proposed, not a drawing of another similar unit. All submitted drawings will become a part of the bid proposal.

REJECTION OF PROPOSALS

The right is reserved to reject any or all proposals or to accept such proposal as is in the best interest of the purchaser.

All bid requirements and specifications as written are considered minimum.

Bids will be rejected which substitute less substantial materials and/or methods of body construction than those specified. Since all manufacturers have the ability to purchase the materials described as well as to shear, fabricate and assemble body panels as specified, these areas are considered a strict requirement of the specification.

Purchaser does not, in any way, obligate itself to accept the lowest Bid.

Proposals may be rejected for any alteration, erasures, or penciled entries. No bidder may withdraw his proposal for at least 30 days after the scheduled closing time for the receipt of bids.

Bidders taking "total exception" to these specifications are hereby advised that any such statement will result in immediate rejection of the bid proposal.

Bidder Complies	
Yes	No

COMPLETION DATE

Bidders shall indicate in their proposals the number of working days for delivery of the completed apparatus, from the date of bid acceptance by the Manufacturer.

CARRYING CAPACITY

The GAWR and GCWR or GVWR of the chassis shall be adequate to carry the fully equipped apparatus including full water and other tanks, the specified hose load, unequipped personnel weight, ground ladders, and a miscellaneous equipment allowance of 2000 pounds.

A permanent placard shall be affixed and visible to the driver, which states the maximum number of personnel the vehicle is designed to carry.

The height of the fully loaded vehicle's center of gravity shall not exceed the chassis manufacturer's maximum limit.

WARRANTY

As a condition of the acceptance of the apparatus, the contractor shall furnish the following warranty:

We the manufacturing company, warrant each new piece of fire apparatus manufactured by us to be free from defects in material and workmanship under normal use and service. Our obligation under this warranty is limited to repair or replacing, as the Company may elect, any part or parts thereof which shall be returned to us with transportation charges prepaid and as to which examination shall disclose to the company's satisfaction to have been defective, provided that such part or parts thereof shall be returned to us not later than one year after delivery of said vehicle. Such defective part or parts will be returned or replaced free of charge and without charge for reinstallation, to the original purchaser.

This warranty will not apply:

1. To normal maintenance, service or adjustments.

2. To any vehicle which has been repaired or altered outside of our factory in any way so as in our judgment, to affect its stability, which has been subject to misuse, negligence, or accident, which has been operated at a speed exceeding the factory rated speed, or which has been loaded beyond the factory rated load capacity.

3. To the truck chassis and associated equipment furnished with the chassis, including, but not limited to; engine transmission, axles, frame rails, alternator, batteries, or other trade accessories in as much as they are warranted separately by their respective manufacturers.

This Warranty is in lieu of all other warranties expressed or implied and of all other obligations or liabilities on our part and we neither assume nor authorize any other person to assume for us any liability in connection with the sale of our apparatus.

Bidder Complies	
Yes	No

DESIGN REQUIREMENTS

Specified design features of the apparatus have been carefully selected because of their safety, integrity and consistency with existing apparatus. It is expected that all bidders will adhere to the compartmentation layout, etc., since these features can be produced by all fire apparatus manufacturers.

All aspects of the vehicle shall be properly engineered with priority given to firefighter safety, as well as ease of operation and maintenance of the apparatus. The vehicle shall be free from hazardous protrusions, angles or sharp corners that might bring injury to a firefighter or equipment. Previously delivered units will be judged for compliance to these factors.

All water, air, fuel, hydraulic and/or oil lines on the chassis and apparatus shall be properly located, and securely tie wrapped to prevent scuffing or abrasion. Durable type grommets or loom material shall be used to protect the lines wherever a line passes through the apparatus body or frame rail sections.

All grease fittings, bleeders, filler plugs, drains and check points shall be located so as to be easily accessible. No special tools shall be required to access these components for normal service or maintenance of the vehicle.

All parts and components on the vehicle shall be positioned for ease of inspection, and recognition of wear or failure. Easily removable access or cover plates shall be provided for all items requiring periodic service or adjustment. Access panels shall be of the hinged or quick disconnect design-allowing ease of access.

Design of the apparatus shall be such that no disassembly of the body or any of its parts is required for normal maintenance.

All components of the chassis and apparatus shall be protected against rain, snow or other adverse weather conditions.

CONTRACT AWARD

Contract will be awarded to the most "responsible bidder", provided that bid is in the best interest of the purchaser.

When analyzing the bid proposals, and in recommending a successful bidder, superior design, workmanship, materials, operating costs, location of factory, past experience, length of incorporation and compliance to specifications will be taken into consideration.

Purchaser reserves the right to waive any formality in the bids received once such waiver is in the best interest of the purchaser and, also, to accept any item in the Bid found to be of superior quality or otherwise preferred by the Purchaser.

Bidder Complies	
Yes	No

ACCEPTANCE TESTS AND REQUIREMENTS

Acceptance tests on behalf of the purchaser shall be prescribed and conducted prior to delivery or within 10 days after delivery, by the manufacturer's representative in the presence of such person or persons as the purchaser may designate in the requirements for delivery.

The apparatus, loaded with a full complement of hose and men, a full water tank, and equipment as specified in "Carrying Capacity" on this page, shall meet the tests on paved roads, dry and in good condition. Tests shall be on the basis of two runs, in opposite directions over the same route, the engine not operating in excess of the manufacturer's maximum rpm.

From a standing start, through the gears, the vehicle shall attain a true speed of 35-mph within 25 seconds. From a steady speed of 15-mph the vehicle shall accelerate to a true speed of 55-mph within 30 seconds.

The vehicle shall attain a minimum top speed of 65-mph on a level road.

The apparatus shall be able to maintain a speed of at least 20-mph on any grade up to and including 6 percent.

Manufacturers pump test and Certification tests shall be conducted by the manufacturer in accordance with requirements of NFPA #1901. Certificate of testing shall be furnished to the purchaser.

NOTE:

Responsibility for the apparatus and all equipment shall remain with the contractor until the apparatus and equipment is delivered to the purchaser.

FAILURE TO MEET TESTS

In the event the apparatus fails to meet the test requirements on first trial, a second trial may be made at the option of the Contractor within thirty days of the date of the first trial. Such trials shall be final and conclusive and failure to comply with these requirements shall be cause for rejection. Failure to make such changes as the Chief of the Fire Department and/or the purchaser may consider necessary to conform to any clause of the specifications within thirty days after notice is given to the Contractor to make such changes shall also be cause for rejection of the apparatus.

DOCUMENTATION

The manufacturer must supply at time of delivery, at least one copy of:

1. Engine manufacturer's certified brake horsepower curve showing the maximum no load governed speed.

2. Manufacturer's record of pumper construction details.

3. Pump manufacturer's certification of suction capability.

4. Pump manufacturer's certification of hydrostatic test.

5. If specified certification of inspection and testing by the Underwriter's Laboratories Incorporated.

6. A copy of the apparatus manufacturer's approval for stationary pumping applications.

7. Weight documents from a certified scale showing actual loading on the front axle, rear axle(s), and overall vehicle (with water tank full but without personnel, equipment, or hose).

8. At least two copies of the complete operation and maintenance manual covering the completed apparatus as delivered, including the pump and firefighting equipment delivered with the apparatus.

NO EXCEPTIONS WILL BE ALLOWED TO ANY OF THE DOCUMENTATION REQUIREMENTS.

PAYMENT

Final payment for the apparatus shall be made at time of delivery of the completed vehicle. Due to insurance liability, the apparatus will not be left at the purchaser's location without full acceptance and payment or prior agreement between the Purchaser and Bidder.

Final delivery price shall not include any Local or Federal taxes. The Bidder shall not be liable for any State or Federal mandated tax or program after sale or delivery of the apparatus.

PRE-CONSTRUCTION CONFERENCE (AT FIRE DEPARTMENT)

A pre-construction conference shall be conducted at the Fire Department Headquarters, at which time all final designs and equipment mounting locations will be approved, prior to any sheet metal being cut. A factory-trained representative shall be present during the pre-construction conference to answer any design questions relating to the layout of the apparatus. All expenses for travel, meals, and lodging shall be included. BIDDER SHALL INDICATE INTENTION TO PROVIDE THE REQUIRED PRE-CONSTRUCTION CONFERENCE IN THE PROPOSAL PACKET.

INSPECTION TRIP(S)

The bidder shall provide one (1) factory inspection trip for two (2) customer representatives. The inspection trip shall be scheduled at a time mutually agreed upon between the manufacturer's representative and the customer. All costs such as travel, lodging and meals shall be the responsibility of the bidder.

MOBILE SERVICE REQUIREMENT

Due to the cost, downtime and inconvenience associated with sending vehicles to a service facility, mobile service is required to be available. The scope of service must include both warranty and non-warranty repairs and service. The cost of travel expenses, mileage and/or other

Bidder Complies	
Yes	No

expenses associated with warranty service must be listed in the bidder's response**. No exception to the requirement of mobile service shall be accepted.**

LOCAL DEALERSHIP WITH SERVICE FACILITY

Due to the complex nature of fire apparatus the manufacturer or local dealer shall have an in state (Idaho) service facility.

DELIVERED UNITS

The vehicle manufacturer shall provide a listing of ten (10) recently delivered units of similar design. The list shall include a contact person and phone number who represents the purchaser.

DEMONSTRATION

Fire Department personnel shall be properly instructed as to the proper use of the entire apparatus including, but not limited to, chassis, fire pump system, the apparatus and all equipment. The demonstration shall be made by a factory trained Specialist who shall be responsible for complete instruction as to operation and maintenance of the chassis, and the completed vehicle.

A demonstration specialist shall remain at the Fire Department for a sufficient amount of time to provide thorough instruction to all personnel, or as instructed by Chief of the Department. All meals, motel and travel costs shall be the responsibility of the successful bidder.

DELIVERY

The apparatus shall be delivered complete and ready for operation. The apparatus, to insure proper break-in of all components, shall be delivered under its own power - rail or truck freight is not acceptable. Please state the delivery cost as a separate line item on the proposal form.

FINANCIAL STABILITY SPECIFICATIONS

Ensuring the financial stability of the proposed body builder is a paramount consideration to this department. Financial strength directly relates to the body builders ability to successfully produce an apparatus without jeopardizing fire department funds. In addition, financial strength is vital to this department to insure a body builder will be able to provide warranty service along with replacement parts and service for the life of the apparatus. Failure to be able to provide these lifelong services may cause future increases in maintenance expenses and create undue burden on the department's budget and tax base. This is a situation that this department is unwilling to risk. The body builder, therefore, shall meet certain minimum financial ratios in order to qualify for a bid award. The financial ratios presented shall be that of the consolidated entity; not the consolidated entities parent company; for the body builder.

The financial ratios required to be met shall be derived from the most recent audited financial statements of the body builder proposed.

The three (3) critical financial indicators to be met are as follows:

Bidder Complies	
Yes	No

Debt-to-Equity Ratio: The debt-to-equity ratio of the entity must not exceed a 2.0 rating. A debt-to-equity ratio is defined as that of total liabilities divided by total owner's equity. In laymen's terms, a low debt-to-equity ratio means the company itself owns a greater share of its assets, as opposed to banks, creditors and other financial institutions. Conversely, companies with high debt-to-equity ratios are those that are generally financing their growth by carrying additional debt. The cost of this debt-financing may outweigh the return that the company generates on the debt through business activities and become too much for the company to manage. This can lead to bankruptcy, which is of grave concern to this purchaser.

Debt Coverage Ratio: The debt coverage ratio of the entity must exceed a 100.0 rating. A debt coverage ratio is defined as annual net income divided by the current portion of long-term debt. A high debt coverage ratio means the company can easily meet its payment obligations with its banks and other creditors. A low debt coverage ratio clearly infers the company may struggle to meet these obligations, which could ultimately delay or cancel production of apparatus.

Equity Ratio: The equity ratio of the body builder must exceed a .30 rating. An equity ratio is defined as total owners' equity divided by total assets. The equity ratio is another good indicator of the level of leverage (or financing) used by a company. The equity ratio measures the proportion of the total assets that are financed by owners and not creditors. A high equity ratio provides the company with flexibility in financing growth and other needs.

Financial reports may be required to be submitted to the purchaser for evaluation prior to awarding the contract. All financial indicators required by this section must be verified by Dun and Bradstreet, the nationally-recognized, independent financial analysis company. Bids furnished without the financial information, if required, shall render the bid non-responsive and the bidder dismissed from further consideration. **NO EXCEPTIONS.**

Bidder Complies	
Yes	No

APPARATUS DIMENSIONS SPECIFICATIONS

OVERALL HEIGHT

The overall height restriction of the apparatus shall not exceed 10’10”.

MAX LENGTH

The maximum length of the apparatus shall not exceed 31' 8”.

OVERALL WIDTH

The over width shall not exceed 102”.

MAX WHEELBASE

The maximum wheelbase of the apparatus shall not exceed 206”.

ANGLE OF APPROACH

The angle of approach for the apparatus shall not be less than eight (8) degrees as specified by the current edition of NFPA 1901.

ANGLE OF DEPARTURE

The angle of departure for the apparatus shall not be less than eight (8) degrees as specified by the current edition of NFPA 1901.

Bidder Complies	
Yes	No

APPARATUS CHASSIS SPECIFICATIONS

CAB CUSTOM STYLE

The cab shall be a custom, cab over engine style, with the driver and officer positions ahead of the engine and front axle. The cab shall be specifically designed and manufactured for the fire service industry.

The cab shall be designed and assembled by the apparatus manufacturer in a facility located on the manufacturer's premises. No Exceptions.

The cab shall be of a totally enclosed full tilt design, with the interior area completely open to improve visibility and verbal communication between the occupants. The cab shall be capable of tilting 45-degrees, allowing the chassis engine to be removed, if required, without tilting the cab beyond 45-degrees. No Exceptions.

The cab shall include a four (4)-point rubber isolated cab pivot and mounting system. The rear histic mounts shall be isolated from the chassis frame to reduce the transfer of road vibrations and frame torque into the cab, while providing superior handling characteristics. No solid mounted rear lock downs shall be acceptable. No Exceptions.

The front cab pivot assemblies shall be 1/2" A36 steel plate with a .31" thick 2-1/2" diameter tube cross member mechanically attached to the cab and frame. There shall be two (2) greaseable rubber isolated engineered bushings to reduce the transfer of road vibrations into the cab.

The cab shall be locked down by a two (2)-point automatic spring-loaded hook mechanism that actuates after the cab has been lowered.

The cab super-structure shall be designed with high strength 6061-T6 aluminum extrusions and 3/16" 5052-H32 aluminum plate. This shall include the “A”, “B”, “C” and “D” extruded pillars, triple wall front end reinforced by 3/16" thick x 2"x3" extrusion tubes, 3/16" side walls, roof and 3/16" rear wall. This shall offer superior occupant protection in the event of vehicle impact.

The extrusions shall provide adequate space for routing of wiring and hoses which will provide service accessibility. Routing of harnessing which requires pulling of wires through tubes will not be allowed. No Exceptions.

The "A" pillar shall be of a closed section, one-piece extrusion extending from the cab header to the bottom of the cab. This design shall ensure strength and superior resistance to buckling in the event of a frontal impact.

The cabs front corners shall be constructed of 5052-H32 stamped aluminum to provide a consistent material composition. The stamping process alleviates the high tendency of fractures through the fusing of dissimilar metal composition as appears with a casting process.

Cast cab components, including cab corners, "A" pillars and front fascia components shall not be acceptable due to the high tendency of fractures. No Exceptions.

Additional cab strength shall be obtained through closed section, dual extrusions in the construction of the "D" pillars.

The front façade shall be constructed with dual wall .19” thick 5052-H32 aluminum plates which make up the front bulkhead, reinforced by .19” thick 6061-T6 aluminum extrusion (box-sections), though-out the inner and outer perimeter of the front end / façade. The reinforcing third wall / barrier is .13” thick 5052-H32 work hardened aluminum façade panels. All panels shall be welded, no adhesive.

The cab side wall of the cab shall be 3/16” thick 5052-H32 aluminum plate. The cab side plate shall wrap the corner of the cab b pillar and slam post. The cab rear wall plates shall be reinforced with a minimum of two (2) 3/16 x 3” aluminum sections; the cab side reinforcements shall be a minimum of 28” apart and span from the cab B pillar and cab C pillar.

The rear wall of the cab shall be 3/16” thick 5052-H32 aluminum plate. The rear cab plate shall wrap the corner of the cab and attach to the cab D pillar and slam post. The cab rear wall plates shall be reinforced with four horizontal and dual vertical support sections; the dual vertical support structure shall consist of 1/8” thick x 2” 6061-T6 aluminum tubes and the horizontal hat sections shall consist of 1/8” thick x 4” 5052-H32 aluminum. The dual vertical support sections shall be 40” a-part, and the cab shall contain a minimum of four (4) 4” hat section horizontal supports.

Additionally, the rear edge of the floor shall include a 3/16” 6061-T6 aluminum tube extrusion (under the floor) and a 7” 5052-H32 aluminum cab floor support section (above the floor)

The outside cab width shall measure 99” across. The interior cab shall have a width of 93".

The cab length shall measure 77.3” from the center of the front axle to the front cab skin and 60” from center of the front axle to the back of the cab, for a total cab length of 137.3”.

The cab shall also feature ample driver and officer foot room, a total of 3.7 square feet for the driver and 4.45 square feet of floor space at the officer’s feet. (No exceptions)

The crew floor shall feature a complete flat floor design, including provisions for a one o'clock PTO inclusion, while still offering an uninterrupted 25 total square feet of space. The distance from the back of the tunnel to the interior wall shall be 46" measured at floor level and 52" at top of engine tunnel.

The leading edge of the cab floor from the steps shall meet NFPA 13-7.3 slip resistance requirements, by using bi-directional, knurled trim piece on both the front and rear cab doors. No Exceptions.

The cab shall incorporate a two-step design at each door, with a first step height of approximately 22” from the ground. The leading edge of the first step shall be 5" further outboard than the second step to provide a staircase design for safer egress.

The front cab first step shall measure a minimum of 32" wide x 9-1/2" deep. The front cab intermediate step shall measure a minimum 33" wide x 8-1/2" deep.

Bidder Complies	
Yes	No

The crew cab first step shall measure a minimum of 26-1/2" wide x 9-1/2" deep. The crew cab intermediate step shall measure a minimum 28" wide x 9-1/2" deep.

The cab shall meet or exceed cab impact test (SAE J-2420, cab rollover test (SAE J2422), and cab seating requirements (FMVSS 210, and FMVSS 208).

The cab shall include 4 doors. They shall have a front two (2) cab doors shall have a minimum clear opening of 42.5" wide by 81" high measured from the top of the lower cab step to the top of the door opening.; and the rear two (2) crew doors shall be a minimum clear door opening of 38.5" wide by 91.5" high measured from the top of the lower cab step to the top of the door opening. The length of the door will vary depending on door type.

ROOF STYLE - 11" RAISED

The cab roof design shall incorporate an angled front roof, transitioning into a rolled extrusion for a swept back design.

The roof height shall feature an 11" raise starting over the driver and officer positions and continuing back to the roof and rear wall joint. Raised roof designs that do not include a raised portion over the driver and officer positions will not be acceptable. No Exceptions.

The roof of the cab shall feature dual .25" thick interlocked structural member extrusions running the entire width of the cab defending against buckling in the event of a rollover.

The cab header shall feature dual 6061-T6 aluminum extrusions which shall offer superior rigidity and strength.

The raised roof shall offer a crew head height area of 66-1/2" from the floor to the ceiling in the crew areas for optimum headroom.

The crew roof super structure shall include a reinforcement hat-section structure 1/8" thick 5052-H32 aluminum bracing. The for-aft support braces will be 24" on center apart, the side to side support braces will stretch from cab side to cab side and centered between the dual 3/16" extruded and plate reinforced roll-cage section.

The forward cab roof section shall include a combination of 1/8" 6061-T6 extruded tube reinforcements and a hat-section structure 1/8" thick 5052-H32 aluminum bracing. The bracing shall wrap the entire perimeter of the cab forward roof, and the condenser support structure.

The condenser support structure shall include 1/8" triple sections, supporting the outer perimeter and center of the condenser mounting pad.

Additionally, the entire roof super structure is reinforced by a .25" thick roof edge corner extrusion around the entire cab perimeter.

Bidder Complies	
Yes	No

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

CAB DOORS

The cab shall include a total of four (4) doors, two (2) forward and two (2) rear crew doors.

The forward cab doors shall be a minimum of 45" wide, and have a clear door opening of 42.5" wide; and the rear crew doors shall be a minimum of 41" wide, and a clear door opening of 45.75" wide to provide enhanced entry and egress of the cab.

The two (2) forward doors shall offer a clear opening measurement of 51.5" wide and the two (2) rear crew doors shall have a clear opening measurement of 45.75" wide, measured from door seal to door seal.

Each cab door shall feature:

- Superior strength and rigidity from 3/16" closed section extruded door frames
- Insulation and damping inside each door for a solid feel and minimized reverberation when closed
- A minimum of 1" rolled rubber bulb seal style gasket and an "L" foam seal around the door ensuring a weather tight fit
- Integrated, mechanical door stop
- A full length, hidden piano style 10 gauge stainless steel door hinge with a 1/4" pin, which shall be mounted inside the panel of the door prohibiting dirt and debris from becoming trapped in the hinge
- An integrated one-piece inner door assembly that includes a glass track, mounting provisions for window regulator, door handle and door panel shall be utilized. The inner door assembly shall be easily removed with nut inserts. Self-tapping screws shall not be acceptable.

CAB STEPS

The cab steps shall meet NFPA 13-7.3 in size and slip resistance requirements.

The cab shall incorporate a two-step design at each door, with a first step height of approximately 22” from the ground. The leading edge of the first step shall be 5" further outboard than the second step to provide a staircase design for safer egress.

The front cab first step shall measure a minimum of 32" wide x 9-1/2" deep. The front cab intermediate step shall measure a minimum 33" wide x 8-1/2" deep.

The crew cab first step shall measure a minimum of 26-1/2" wide x 9-1/2" deep. The crew cab intermediate step shall measure a minimum 28" wide x 9-1/2" deep.

Bidder Complies	
Yes	No

The top crew step shall incorporate an angle approximately midway from the rear wall to the crew door hinge extending out the flooring under the rear facing outer seat positions, offering foot placement for safety while seated in this position.

CAB STEP TRIM

The lower cab steps at all doors shall be finished with a grip strut material. The intermediate cab steps shall be finished with an embossed aluminum tread plate.

FULL HEIGHT DOORS

All doors shall be full height from the roof of the cab extending down to cover and protect the entrance step areas.

DOOR FILL PANEL

The door fill panel shall have the same finish as the door.

DOOR HANDLES

The exterior door handles shall be constructed of die-cast steel and chrome plated for a pleasing appearance. They shall feature a vertically oriented heavy duty pull style handles which are extended out and suitable for easy grasping with a gloved hand.

The interior door handle shall be a chrome plated paddle style latch. The paddle shall be hinged towards the front of the cab and shall include a manual door lock unless otherwise specified.

Each door latch shall feature a military grade aligning dove tail guide striker assembly for precision door closure which prevents sagging throughout the life of the vehicle.

CAB DOOR LOCKS

All cab doors shall include manual door locks with keys. The door lock shall include a toggle and shall be an integral part of the interior door handle which is red in color. The exterior door lock is integral with the door latch. The cab doors may be unlocked from the exterior with a key or through a thumb turn from inside the cab.

INTERIOR CAB DOORS

All cab doors shall consist of a one-piece formed and stamped aluminum interior panel. The panel shall include a formed collar around the interior door latch. ABS material shall not be acceptable. No Exceptions.

INTERIOR CAB DOOR FINISH

All cab doors shall be finished with a polyurethane coating for durability. The finish shall be black in color.

Bidder Complies	
Yes	No

CAB DOOR REFLECTIVE TRIM

Cab door reflective trim compliant with NFPA 14.1.6. shall be provided.

INTERIOR FRONT DOOR PULL

The interior driver and officer cab doors shall include one (1) customized cast aluminum single piece door grab pulls designed specifically for the fire service.

The single piece door pull shall have a curved designed in an “L” formation to provide multiple points for grasping with a gloved hand. The horizontal dimension shall be a minimum of 28" and the vertical dimension shall be a minimum of 20". The door pulls shall have an ergonomic curve making them easier to grasp when entering and exiting the cab. No Exceptions.

The door pull shall feature secure mounting in three separate locations of the pull utilizing stainless steel fasteners with nut inserts in each location. Self-taping screws or other mounting techniques shall not be allowed for interior door pulls or grab handles.

Each handle shall be constructed of A356 aluminum casting and shall feature a black powder coated finish.

INTERIOR GRAB HANDLE REAR DOOR

A black powder coated cast aluminum grab handle shall be provided on the inside of each rear crew door. The handle shall extend horizontally the width of the window just above the windowsill. The handle shall assist with entry and egress from the crew area of the vehicle.

The interior driver and officer rear cab crew doors shall include one (1) customized cast aluminum single piece door grab pulls designed specifically for the fire service.

The door pulls shall have an ergonomic curve making them easier to grasp when entering and exiting the cab. No Exceptions.

The door pull shall feature secure mounting with stainless steel fasteners with nut inserts in each location. Self-taping screws or other mounting techniques shall not be allowed for interior door pulls or grab handles.
Each handle shall be constructed of A356 aluminum casting and shall feature a black powder coated finish.

WINDSHIELD

A one (1)-piece, safety glass full width windshield with more than 3,228 square inches of clear viewing area will be provided.

The windshield shall feature:

- A completely uninterrupted view from both the driver and officer positions

- The windshield will consist of three (3) layers; the outer layer, the middle safety laminate, and the inner layer. The .114" thick outer light layer will provide superior chip resistance. The middle safety laminate layer will prevent the windshield glass pieces from detaching in the event of breakage.
- Economical replacement readily available from auto glass supplier
- Easily removable for replacement using standard automotive techniques
- A frit band will be provided along with an outer trim seal on the outside perimeter of the windshield for a finished automotive appearance.

WINDSHIELD WIPER SYSTEM

A single windshield wiper system shall be incorporated in conformance with FMVSS and SAE requirements. Two (2) 22" windshield wiper arms shall be mounted below the windshield. Each arm shall include a 26" long wiper to provide optimum windshield clearing.

The windshield wiper fluid reservoir can be filled without raising the cab.

WINDSHIELD WIPER ACTIVATION

The windshield wipers shall be activated through a switch on the driver's panel.

WINDOW -DRIVER'S DOOR

The driver's door shall include a window which measures 24" wide x 23" high with a minimum clear viewing area of 552 square inches. The glass shall include a standard automotive tint and through the use of a manual crank style handle shall roll completely into the door housing.

There shall be a fixed angled window in the forward portion of the door. It shall measure 6" wide at the bottom 1.5" wide at the top, and it shall be 24" tall; with a clear viewing area of 90 square inches.

The window shall be trimmed in a black anodized aluminum ring and rubber seal to keep water from entering the cab when closed.

WINDOW- OFFICER'S DOOR

The officer's door shall include a window which measures 24" wide x 23" high with a minimum clear viewing area of 552 square inches. The glass shall include a standard automotive tint and through the use of a manual crank style handle shall roll completely into the door housing.

There shall be a fixed angled window in the forward portion of the door. It shall measure 6" wide at the bottom 1.5" wide at the top, and it shall be 24" tall; with a clear viewing area of 90 square inches.

The window shall be trimmed in a black anodized aluminum ring and rubber seal to keep water from entering the cab when closed.

REAR DRIVER SIDE CREW WINDOW

The rear driver's side crew door shall include a window measuring 26.75" wide x 21.75" high with a minimum clear viewable area of 581 square inches. The glass shall include a standard automotive tint and through the use of a manual crank style handle shall roll completely into the door housing.

REAR OFFICER SIDE CREW WINDOW

The rear officer's side crew door shall include a window measuring 26.75" wide x 21.75" high with a minimum clear viewable area of 581 square inches. The glass shall include standard automotive tint and through the use of a crank style handle shall roll completely into the door housing.

DRIVER CANOPY SIDE WINDOW

The cab shall include a fixed driver's side window glass which shall be located between the cab front and rear doors. The glass shall be 17.5" wide x 23.5" high and shall include a standard automotive tint and shall be trimmed in a black anodized rubber ring for a tight seal when closed.

OFFICER CANOPY SIDE WINDOW

The cab shall include a fixed officer's side window glass which shall be located between the cab front and rear doors. The glass shall be 17.5" wide x 23.5" high and shall include a standard automotive tint and shall be trimmed in a black anodized rubber ring for a tight seal when closed.

CAB INSULATION

The cab shall be completely insulated from road and vehicle resonance, exterior sound and thermal intrusion.

The cab insulation system shall be comprised of three separate components each designed to assure optimal thermal and acoustic properties are achieved. Two layers of insulation material shall be utilized in conjunction with a .2” air barrier.

The cab shall utilize at a minimum 10 mils of flexible extensional visco elastic vibration damping insulation offering excellent acoustic reduction properties.

A minimum of .8” of SCbond Polyurethane Foam insulation shall be applied as an additional insulation between the cab skin and all interior ceiling and wall surfaces. The insulation shall have a density of 10 lb. /ft3 +/-.5 providing better thermal properties and acoustic reduction properties.

The interior cab insulation system shall ensure that no seated position within the cab exceeds 72dB as certified by the manufacture. This decibel rating shall be measured with the apparatus traveling 45 mph with climate control settings off. All insulation used in the construction of the cab shall be marine grade featuring longevity and resistance to degradation.

Use of open cell material as the primary insulation will not be acceptable. No exceptions.

ENGINE TUNNEL INSULATION

The engine tunnel shall include an insulated barrier from noise on the underside of each tunnel surface. This barrier shall be engineered for surrounding engines.

Bidder Complies	
Yes	No

The insulation barrier shall provide an acceptable decibel level within the cab meeting or exceeding the recommendations of NFPA 1901.

The thickness of the engine tunnel insulation shall be 1" thick. The insulating material shall be open cell polyether based foam with a textured surface, specifically designed for acoustic absorption.

Use of aluminized faced material on the engine tunnel shall not be acceptable. No exceptions.

The engine tunnel insulation shall be precisely cut and sealed to fit each segment on the underside of the tunnel surface. The insulation shall then be affixed by a pressure sensitive adhesive.

The insulation shall meet or exceed FMVSS 302 flammability testing.

CAB UNDERBODY INSULATION

The underside of the cab shall include at a minimum of 1" of a uni-seal Cab-Foam insulation offering reducing vibration noise and thermal effect to the interior of the cab.

DAMPING INSULATION

The entire cab, including the ceiling and walls shall include additional insulation reducing structure borne noise from vibration, impact and resonance within the cab.

INTERIOR TRIM MATERIAL

The interior trim shall feature a 31 oz. marine grade vinyl which features a tensile strength of ASTM D751 of excellent, tear strength meeting the Federal standard 191-5134 of excellent and shall be oil resistant passing the CID-A-A-2950A requirement for no permeation.

Due to the excellent qualities of the marine grade vinyl material, no other type of interior trim shall be acceptable.

The soft trim vinyl shall feature mildew resistance passing ASTM G21-90 and shall be rated to -25 degrees Fahrenheit.

The vinyl shall be flame retardant meeting California Fire Code 117, UFAC Class 1, and BIFMA Class 1 and shall have a high resistance to abrasion.

The interior of the cab including the side walls and ceiling panels shall feature this soft trim and shall be black in color.

REAR WALL INTERIOR MATERIAL

The rear wall of the cab shall be covered in black 31 oz. marine grade vinyl for a more pleasing appearance.

Bidder Complies	
Yes	No

FLOOR MAT

The interior flooring of the cab shall be covered with an advanced black multi-layer acoustic dampening mat. The floor matting shall be an open/closed cell, flexible polyurethane polyamide material with frictional dampening and dissipation properties. The mat shall be a fire and skid resistant non-wicking material.

SUN VISORS

The driver and officer seats shall feature a sun visor mounted in the header over each seating position. The sun visors shall be padded and trimmed in vinyl.

CAB DASH

The cab dash shall offer heavy duty, durable construction using resin transfer molding (RTM) technology formed composite material. The composite material shall be .28" thick for improved resistance and military type strength.

RTM is a low pressure, closed molding process which offers a dimensionally accurate and high quality surface finish composite molding, using liquid thermoset polymers reinforced with various forms of fiber reinforcements. The matrix selection of polymer and reinforcement dictates molding mechanical and surface finish performance.

ABS polymer construction shall not be acceptable.

The cab dash shall offer a finish of a polyurethane coating for a rugged design and finish. No Exceptions.

The polyurethane finish shall provide a tough, flexible, impact-absorbing, chemical & abrasion-resistant, even-textured and skid-resistant surface. The polyurethane finish shall offer durability and scratch resistance even against today's advanced firefighting turnout materials with consistent, even coverage and a uniform texture. The polyurethane coating finish shall resist fading from UV light.

This construction shall allow for a clean, seamless dash area that shall reduce unnecessary joining of cab dash components. This design allows for the following features:

- Optimal heating and cooling of cab occupants, HVAC louvers shall be integrated into the gauge panel with a total of six (6) louvers; three louvers pointing at the driver and three louvers pointing at the officer.
- The cab dash instrument cluster shall be installed on a painted fire service grade RTM composite fiberglass panel. This panel shall provide for easy removal to increase serviceability and provide ease of maintenance.
- For improved safety cab switches and controls shall be ergonomically located within easy reach of the driver when in the seated position with seatbelts fastened. This design will reduce driver distraction and increase safety by putting frequently accessed driver controls within easy reach to allow the driver more time to focus on the road.

- The officer side cab dash shall have a painted fire service grade RTM composite fiberglass panel that shall house the three HVAC louvers on the officer side. This panel will also provide ergonomically located switches and controls for the officer. All controls shall be within easy reach while in the seated position with seatbelts fastened.

- Access panels on the top of the dash for both the driver and officer sides easing maintenance access to controls, components and gauge assemblies

- The driver side dash shall include gauges for primary air pressure, secondary air pressure, a Pacific Insight instrumentation gauge panel and the DEF gauge as standard

- The driver side dash shall also include two (2) lower panels to the left and right of the steering column for FMVSS switches such as the Off/Ignition and start switches and the park brake assembly

- The driver dash shall include a panel for inclusion of an optional Weldon Vista screen and seven (7) additional switches or the HVAC controls and additional switching to the right of the Driver

- The officer dash shall include a recessed area for optional mounting cradles or brackets for a laptop computer, mobile data terminal, map compartment or clip board

- The officer dash shall include a panel for inclusion of an optional Weldon Vista screen and seven (7) additional switches or provisions for switches and gauges to the left of the Officer.

ENGINE TUNNEL

The engine tunnel shall be constructed of aluminum offering superior durability in addition to thermal and acoustic resistance. Covering the engine tunnel shall be a layer of formed composite material for a contoured transition into the dash and offering a pleasing appearance.
The tunnel shall feature a polyurethane coating which shall match the dash and header in texture and color for a consistent appearance and robust finish with a thickness of approximately .28".

The engine tunnel shall feature:

- A low profile design measuring approximately 46.5" wide and 23-1/2" in height from the crew floor shall offer optimum visibility of the windshield and cab interior from any seated position. No Exception.

- The engine tunnel at the driver's position shall be a tapered design, featuring 24" clear width at floor level, first taper shall start 16" from floor level and taper inward for a clear width of 25.5" and the final taper shall start at 20.5" from floor level and taper inward for a clear width of 33".

- The engine tunnel at the officer's position shall be a tapered design, featuring 22-1/2" clear width at floor level, first taper shall start 16" from floor level and taper inward for a clear width of 24" and the final taper shall start at 20.5" from floor level and taper inward for a clear width of 31-1/2".

Bidder Complies	
Yes	No

- The design shall offer a minimum of 26" for the driver and 24" for the officer as measured from the inside door pan to the top edge of the tunnel. The dimension measured at the "H" (hip) point, with the seat in the lowest position, shall be a minimum of 28-1/2" for the driver and 27" for the officer. No Exception.

- Recessed sections for ease of mounting equipment at the rear of the tunnel or for compartments and bases which can be used for installing Fire/EMS equipment and components such as flashlights and light boxes.

CAB DASH & ENGINE TUNNEL

The cab dash and the engine tunnel of the cab shall be coated with polyurethane coating for a durable finish. The color shall be black.

MODULAR CENTER DASH CONSOLE

The dash and front portion of the tunnel shall include an angled modular console centered between the driver and officer positions.

The console shall feature:

- A heavy duty housing constructed from 14 gauge steel which is powder coated with a durable semi-gloss textured black finish to provide glare and corrosion resistance

- The console top constructed of black anodized aluminum extruded rails which allow for mounting brackets, plates, and other console options

- Integral nut tracks which allow mounting of equipment to the sides of the console by way of sliding 1/4"-20 hex nuts
- A hinged lid constructed from 16 gauge steel also powder coated for corrosion resistance

- The availability of pre wiring for specific components

- A modular design for ease of changes and future additions such as changing out brands of radio, types of sirens or adding accessory space

The console shall offer an available eight (8) zones configured with mounting plates for optional components as shown below:

All mounting locations will be determined at the pre-construction conference.

BLACK MOUNTING PLATE

One (1) black mounting plate(s) containing blank plates shall be provided and incorporated in the modular dash console.

Bidder Complies	
Yes	No

BLACK MOUNTING SWITCH PLATE

A black mounting plate containing a switch panel with seven (7) switches shall be provided and incorporated in the center dash console.

BLACK MOUNTING PLATE FOR RADIO

Two (2) black mounting plates containing radio mounting shall be provided and incorporated in the modular dash console.

BLACK MOUNTING PLATE FOR POWER POINTS

One (1) black mounting plate(s) containing two (2) 12 volt power points shall be provided and incorporated in the modular dash console.

CONSOLE MOUNTED LOCKING ACCESSORY BOX

One (1) black mounting plate(s) containing a locking accessory box shall be provided and incorporated in the modular dash console.

CONSOLE MOUNTED CUP HOLDER

Two (2) black mounting plate(s) containing two cup holders shall be provided and incorporated in the modular dash console.

CONSOLE MOUNTED SIREN

One (1) black mounting plate(s) containing mounting for a siren shall be provided and incorporated in the modular dash console.

CONSOLE MOUNTED TRAFFICE LIGHTBAR CONTROLLER

One (1) black mounting plate(s) containing a plate to mount the traffic advisor lightbar controller shall be provided and incorporated in the modular dash console.

INSTRUMENTATION PANEL

The instrumentation panel inlay shall be painted a gloss black.

INTERIOR CAB FINISH

The interior cab shall be finished in a high performance polyurethane coating including the interior A, B, C and D pillars, all occupant seat frames and any surrounding surfaces extending to the ball seal around each door. This type of coating shall feature:

- Durability, scratch, chemical and abrasion resistance
- Consistent, even coverage and a uniform texture

Bidder Complies	
Yes	No

- Resistance from fading from exposure to UV light
- Black in color

CAB HEADER

The cab header shall offer heavy duty, durable construction using resin transfer molding (RTM) technology formed composite material. The composite material shall be .28" thick for improved resistance and military type strength.

RTM is a low pressure, closed molding process which offers a dimensionally accurate and high quality surface finish composite molding, using liquid thermoset polymers reinforced with various forms of fiber reinforcements. The matrix selection of polymer and reinforcement dictates molding mechanical and surface finish performance.

ABS polymer construction shall not be acceptable. No Exceptions.

The cab header shall offer a finish of a polyurethane coating for a rugged design and finish. No Exceptions.

The polyurethane finish shall provide a tough, flexible, impact-absorbing, chemical & abrasion-resistant, even-textured and skid-resistant surface. The polyurethane finish shall offer durability and scratch resistance even against today's advanced firefighting turnout materials with consistent, even coverage and a uniform texture. The polyurethane coating finish shall resist fading from UV light.

The cab header shall also be purpose built for integration of Fire/EMS components and ease of maintenance with panels above both the driver and officer positions measuring 8" wide x 15"long for mounting radios, aerial controls and switches.

MVAC HEATING AND COOLING SYSTEMS

The interior cab climate control shall be comprised of a triple system that shall include a defroster, a cab and crew heater and air conditioner for a complete MVAC system. The air conditioning system shall be comprised of compressor, condenser, and a minimum of three (3) evaporators to provide consistent temperature control throughout the entire cab.

The system shall be rated as an Emergency Vehicle grade for the use in Fire and Rescue style vehicles and shall provide environmental air treatment in accordance with published SAE standards.

The MVAC system shall be tested and certified by the component manufacturer and a third party independent certified testing laboratory, including all three systems. Documentation of test results shall be provided with the bid. No Exceptions.

The MVAC system shall be a total and complete system, and shall provide sufficient defrosting, heating and cooling to the entire cab. The MVAC system shall meet or exceed all specified items without the use of auxiliary heating and cooling systems.

DEFROSTING SYSTEM

The defrosting system shall feature:

- To provide maximum defrost and heating performance, a 30,000 BTU heater-defroster unit with 780 CFM of air flow will be provided inside the cab.
- The defroster unit will be strategically located under the center forward portion of the instrument panel. For easy access, a removable cover will be installed over the defroster unit.
- Mounting under the dash with fresh air intake providing excellent defrost and demist capabilities. Systems not utilizing fresh intake shall not be acceptable. No Exceptions.
- Six (6) vents shall be located in the top forward portion of the dash for superior defrosting properties across the entire windshield.
- The system shall be capable of clearing 90 percent or more of the windshield in fifteen (15) minutes or less after a three (3) hour cold soak at 0 degrees Fahrenheit (-17.78 degrees Celsius).
- The system shall exceed Flash Flogging standards that are set forth in the SAE Heavy Duty Cab with Sleeper specifications. Documentation from a third party testing facility shall be available upon request. No Exception.
- The defroster will include an integral aluminum frame air filter, high performance dual scroll blowers, and ducts designed to provide maximum defrosting capabilities for the one (1) piece windshield.

HEATING SYSTEM

The heating system shall feature:

- Delivery of a minimum of 82,000 BTU/hour of heat to the entire cab.
- Heat and air circulation shall be provided to the driver and officer foot area of the cab as standard through ducting in the foot well area of both positions. No Exception.
- Substantial air movement and heating provided to the driver and officer's position, with six (6) adjustable louvers, located in the dash, three (3) adjustable louvers directed at the driver and three (3) adjustable louvers directed at the officer
- Dual overhead units, with five (5) adjustable louvers shall be mounted above the rear facing seat positions on the driver and officer side of the cab
- A minimum of 880 CFM of air flow measured at the front seated positions and 1580 CFM of air flow per side in the rear seated positions for a combined total of 4040 CFM of air flow in the cab. No Exceptions.
- The heater shall be plumbed with a shut off valve at the engine, so that the coolant bypasses the heaters.

Bidder Complies	
Yes	No

- The heater hoses used will be silicone high heat heater hose.

AIR CONDITIONING

The air conditioning system shall feature:

- A minimum of 96,000 BTU/hour of cooling capacity to the entire cab.
- One (1) evaporator shall be located under the center dash and Two (2) crew overhead evaporators located near the B-pillar on each side of the cab allowing for greater frontal visibility for the forward facing crew seating and allowing for more interior mounting of accessories.
- A gravity condensation drain system shall be utilized. These drains shall remove all condensation from the evaporator units and direct it to the exterior of the chassis cab for optimal performance. Systems utilizing pumps to remove condensation, or gravity systems with poles or other obstructions located within the cab to route drains through shall not be acceptable. No Exceptions.
- Substantial air movement for optimum cooling shall be provided to the driver and officer positions, with six (6) adjustable louvers, located in the dash, three (3) adjustable louvers shall be directed at the driver and three (3) adjustable louvers shall be directed at the officer
- The air condition system shall be capable of cooling the cab from 110 degrees Fahrenheit (43.33 degrees Celsius) to 70 degrees Fahrenheit (21.11 degrees Celsius) at 80% humidity in less than 30 minutes with an engine RPM of 1200; after a three (3) hour heat soak. A certification document from the testing facility shall be available upon request. No Exception.

Proposals offering ceiling mounted evaporator units in the center of the cab above or on the engine tunnel shall not be accepted as this is a safety consideration due to the lack of visibility and communication within the cab.

CAB PAINT AIR CONDITIONING CONDENSER

The air conditioning condenser shall be painted to match the roof color.

CONDENSOR

The cab air conditioning system shall include one (1) low profile HE-condenser which shall be centered forward on the roof of the cab.

HEATING AND COOLING CONTROLS

The HVAC system shall be controlled from the Driver dash through three (3) turn style knobs for the temperature control, the fan control and for the mode. Fan controls shall also be available to the rear crew area.

Bidder Complies	
Yes	No

REAR CREW AREA CONTROLS –CENTERED OVERHEAD

The controls for the crew area heat shall be mounted overhead, centered between the rear facing seating position.

SEAT AND SEAT BELT COLOR

This seat in the cab shall be gray in color with a red seat belt.

DRIVER SEAT

The driver's seat shall be a H. O. Bostrom Sierra high back reclining ABTS bucket seat with Air-50 Suspension. The seat shall have contoured, high-density cushions with lumbar support. The seat cushion shall be supported with a serpentine spring suspension. The back recline shall include a locking mechanism on both sides of the seat and shall have a release handle located at the retractor side of the seat assembly. The seat shall have a double-locking five-inch fore and aft adjustment and Occupancy sensor in the seat cushion. The seat shall include a pneumatic suspension with 3" of vertical ride range adjustable with a molded switch located on the retractor side of the seat assembly. The suspension shall be internally tethered and shall not require secondary tethers from the suspension to the cab structure.

The seat shall be equipped with a red integrated 3-point shoulder harness and lap belt and an emergency locking retractor. The seat belt shall include a buckle latched switch. The seat belt shall include a rotating bezel guide at the upper shoulder point and shall be routed through the seat frame and covering to protect webbing.

SEAT BACK

The seat back shall incorporate a standard style headrest.

SEAT MOUNTING DRIVER

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

SEAT MATERIAL

The seats shall include a covering of high strength, wear resistant fabric made of durable ballistic polyester.

A PVC coating shall be bonded to the back side of the material to help protect the seats from UV rays and from being saturated or contaminated by fluids.

DRIVER SEAT BOX STORAGE COMPARTMENT

There shall be a storage area under the driver's seat. The compartment shall be 21.25 inches wide, 22.50 inches long and 6.25 inches high. The access opening shall be 12.00 inches wide and 4.50 inches high.

Bidder Complies	
Yes	No

ALUMINUM ACCESS DOOR

There shall be an aluminum door cover provided for the driver and officer seat compartment. The door shall be coated to match the interior of the cab, and it shall be equipped with a piano style hinge and a manual latch.

OFFICER SEAT

The officer's seat shall be a H. O. Bostrom ABTS (All Belts To Seat/Integrated Seat Belts) series high back seat with fixed base. The seat shall have contoured, high-density cushions with lumbar support and Occupancy sensor in the seat cushion. The seat cushion shall be supported with a serpentine spring suspension.

The seat shall be equipped with a red integrated 3-point shoulder harness and lap belt and an emergency locking retractor. The seat belt shall include a buckle latched switch. The seat belt shall include a rotating bezel guide at the upper shoulder point and shall be routed through the seat frame and covering to protect webbing.

SEAT BACK

A SecureAll™ SCBA locking system which shall be one bracket model and store all U.S. and International SCBA brands and sizes while in transit or for storage within the seat back. The bracket shall be easily adjustable for all SCBA brands and cylinder diameters. All adjustment points shall utilize similar hardware and adjustments shall be made with one tool.

- The bracket shall be adjustable to compensate for different cylinder lengths without the use of tools. The adjustment shall be made by raising a lever and moving the top clamp vertically

- A center guide fork shall keep the SCBA tank in place for a safe and comfortable fit in the seat back cavity. The SCBA unit simply needs to be pushed against the pivot arm to engage the patented auto- locking system. Once the lock is engaged, the top clamp shall surround the top of the SCBA tank for a secure fit in all directions

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

SEAT MATERIAL

The seats shall include a covering of high strength, wear resistant fabric made of durable ballistic polyester.

A PVC coating shall be bonded to the back side of the material to help protect the seats from UV rays and from being saturated or contaminated by fluids.

Bidder Complies	
Yes	No

OFFICER'S SEAT BOX STORAGE COMPATMENT

There shall be a storage area under the officer's seat. The compartment shall be 19.75 inches wide, 17.50 inches long and 6.25 inches high. The access opening shall be 9.00 inches wide and 4.50 inches high.

REAR FACING OUTER SEAT

Two (2) rearward facing outer crew seat shall be a H. O. Bostrom Tanker 400CT ABTS (All Belts To Seat/Integrated Seat Belts) series with Flip/Up cushion. The seat shall have contoured, high-density cushions with lumbar support and occupancy sensor in the seat cushion. The seat cushion shall be spring biased to fold to vertical position when occupant weight is removed. The seat shall include a SCBA storage area with integral headrest.

The seat shall be equipped with a red integrated 3-point shoulder harness and lap belt and an emergency locking retractor. The seat belt shall include a buckle latched switch. The seat belt shall include a rotating bezel guide at the upper shoulder point and shall be routed through the seat frame and covering to protect webbing.

SCBA SEAT

The seat shall be an HO Bostrom Tanker 450 series seat. The seat shall include an SCBA storage area with one piece flip-up headrest with spring return. The seat shall include two part bolster padding with removable insert to accommodate SCBA's with rigid waist belts.

SEAT BACK

A SecureAll™ SCBA locking system which shall be one bracket model and store all U.S. and International SCBA brands and sizes while in transit or for storage within the seat back. The bracket shall be easily adjustable for all SCBA brands and cylinder diameters. All adjustment points shall utilize similar hardware and adjustments shall be made with one tool.

- The bracket shall be adjustable to compensate for different cylinder lengths without the use of tools. The adjustment shall be made by raising a lever and moving the top clamp vertically
-
- A center guide fork shall keep the SCBA tank in place for a safe and comfortable fit in the seat back cavity. The SCBA unit simply needs to be pushed against the pivot arm to engage the patented auto- locking system. Once the lock is engaged, the top clamp shall surround the top of the SCBA tank for a secure fit in all directions

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

REAR FACING OUTER SEAT MOUNTING

Each rear facing outer seat shall be mounted facing the rear of the cab.

Bidder Complies	
Yes	No

SEAT MATERIAL

The seats shall include a covering of high strength, wear resistant fabric made of durable ballistic polyester.

A PVC coating shall be bonded to the back side of the material to help protect the seats from UV rays and from being saturated or contaminated by fluids.

FORWARD FACING CENTER SEAT

Two (2) forward facing center seats shall be Bostrom fixed seats and shall feature all the seat belts within the seat (ABTS).

SCBA SEAT

The seat shall be an HO Bostrom Tanker 450 series seat. The seat shall include an SCBA storage area with one piece flip-up headrest with spring return. The seat shall include two part bolster padding with removable insert to accommodate SCBA's with rigid waist belts.

SEAT BACK

A SecureAll™ SCBA locking system which shall be one bracket model and store all U.S. and International SCBA brands and sizes while in transit or for storage within the seat back. The bracket shall be easily adjustable for all SCBA brands and cylinder diameters. All adjustment points shall utilize similar hardware and adjustments shall be made with one tool.

- The bracket shall be adjustable to compensate for different cylinder lengths without the use of tools. The adjustment shall be made by raising a lever and moving the top clamp vertically
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- A center guide fork shall keep the SCBA tank in place for a safe and comfortable fit in the seat back cavity. The SCBA unit simply needs to be pushed against the pivot arm to engage the patented auto- locking system. Once the lock is engaged, the top clamp shall surround the top of the SCBA tank for a secure fit in all directions

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

SEAT MOUNTING FORWARD FACING CENTER

The forward facing center seats shall be installed facing the front of the cab.

SEAT MATERIAL

The seats shall include a covering of high strength, wear resistant fabric made of durable ballistic polyester.

Bidder Complies	
Yes	No

A PVC coating shall be bonded to the back side of the material to help protect the seats from UV rays and from being saturated or contaminated by fluids.

SEAT FRAME FORWARD FACING ENCLOSED

The forward facing center seats shall include an enclosed seat box which is located and installed on the rear wall.

The seat box shall be constructed of no less than 5052-H32 .19" thick aluminum plate.

SEAT FRAME FORWARD FACING ACCESS

The seat frame shall include a cutout in the center of the wall facing the tunnel for access.

SEAT COMPARTMENT FINISH

The seat frame shall be finished in a high performance polyurethane coating. The color shall be black.

EXTERIOR GRAB HANDLES

One (1) 18” anti-slip exterior assist handle shall be mounted behind each of the cab doors. The grab handle shall be constructed of aluminum and be 1.25” diameter with a knurled finish enabling non-slip assistance with a gloved hand and mounted on stanchions.

SCUFF PLATE

The grab handles shall include a stainless steel scuff plate to protect painted surfaces.

CAB FASCIA

The cab fascia shall offer a traditional, yet aggressive appearance, in its design and shall be constructed of work-hardened 5052-H32 aluminum. This design shall feature:

- A super structure which is fully welded to the cab, for a seamless and robust integration
- Thermoformed headlamp bezels, constructed of impact resistant, polycarbonate composite which is vacuum metalized to eliminate pealing and bubbling of a chrome type film or plating
- Traditional style headlight bezels with 4 x 6 high intensity headlights which shall add a classic look to the fascia while improving visibility
- The turn signal lights shall be located in the lower outboard portion of the head lamp bezel and a warning light in the lower inboard position

FRONT GRILLE

A prominent front grille shall punctuate the aggressive design of the cab with its outboard wing style warning light bezels and heavy framework. The front grille shall feature:

Bidder Complies	
Yes	No

- Stamped steel construction for superior strength and durability
- Chrome plated for an aesthetically pleasing appearance
- Tiltable and/or removable mesh panel for fluid fill and fluid check access
- Two (2) 4" x 6" warning light locations in the upper wings
- Up to six (6) warning light locations along the mid bar for a variety of warning light combinations

LIGHT BEZEL

The front grille shall include wing light bezels. The bezels shall be constructed of a stainless material.

FRONT GRILLE INLAY

The front grille shall include a honeycomb inlay of stainless steel, painted black, which shall provide air flow to through the grille and provide a sporty, muscular appearance to the front of the apparatus.

The horizontal bars shall be overlaid with polished stainless steel strips.

HEADLIGHTS

A quadruple headlight assembly shall be provided in the fascia to enhance the look. The top two (2) bezels shall include head lamps while the lower bezels shall house a turn signal in the outboard position and a warning light in the inboard position.

DAYTIME RUNNING LIGHTS

The daytime running light feature shall include the headlights on low beam and the marker lights shall be illuminated and a wig-wag or alternating feature.

HEADLIGHT FLASHER

Deliberate operator selection of high beams will override the flashing function until low beams are again selected. Per NFPA, these clear flashing lights will also be disabled "On Scene" when the park brake is applied.

HEADLIGHT FLASHER SWITCH

The alternating high beam headlamp switch shall be located on the driver console.

FRONT TURN SIGNALS

Two (2) Whelen Series 600 LED square, front turn signal assemblies shall be included on the front fascia directly below the headlights, one each side of the cab grille. Each turn signal shall be mounted in an attractive façade style bezel which is an integral part of the fascia.

Bidder Complies	
Yes	No

HEADLIGHT AND MARKER LIGHT ACTIVATION

The head light and marker lights shall be activated through a switch on the driver's panel.

SIDE MARKER LIGHTS

Two (2) Weldon amber LED round, side marker light assemblies shall be mounted on the side of the cab ahead of the driver door, adjacent to the front head lamp bezel.

FRONT MARKER LAMPS

The cab front shall include five (5) LED amber marker lamps above the windshield in accordance with the Department of Transportation requirements.

CAB FENDERS

The cab wheel wells shall include full width, 14 gauge 304 polished, stainless steel cab fenders to resist corrosion and enable easier cleaning maintenance. The inner liner, measuring 18" wide shall be constructed of plastic with an outer fenderette measuring 2.5" wide.

CAB EXTERIOR TRIM

The cab shall include tread plate along the entire exterior wall.

FRONT MUD FLAPS

The cab and chassis shall be provided with rubber front mud flaps.

CAB TILT SYSTEM

The cab shall be a full tilt style. A hydraulic cab lift system shall be provided consisting of an electric powered hydraulic pump, dual lift cylinders, and necessary hoses and valves.

The dual lift cylinders shall lift the cab 45 degrees from a horizontal plane facilitating easy engine maintenance and possible removal.

The tilt angle shall allow access to the engine and area under the cab without contacting any components mounted to the gravel shield.

The cab shall be locked down by a two (2)-point automatic spring-loaded hook mechanism that actuates after the cab has been lowered.

The cylinders shall include blocking valves which prevent motion when no control buttons are pushed. In the event of a hydraulic system failure, the valves shall retain the fluid in the cylinders.

A redundant mechanical stay arm shall automatically be engaged once the cab has been fully raised. Before lowering the cab, this device must be disengaged using the stay arm control located on the driver’s side rear of the cab.

Bidder Complies	
Yes	No

All mounting points shall be bolted directly to the frame rail.

The cab lift safety system shall be interlocked with the parking brake. The cab tilt mechanism shall be active only when the parking brake is set and the ignition is in the on position. If the parking brake is release, the cab tilt mechanism shall be disabled.

A warning light shall illuminate in the cab instrument panel to indicate whenever the cab is not fully latched in the locked down position, and the parking break is release.

REARVIEW MIRRORS

Ramco model CRM-1350-PCHR bus style mirrors shall be provided. The mirror heads shall be injection molded chrome plated ABS plastic and shall measure 9.75" wide x 13.5" high. The mirrors shall be mounted one (1) on each the driver and officer doors of the cab with polished die-cast aluminum arms.

The mirrors shall feature an upper heated remote controlled flat glass and a lower heated remote controlled convex glass. The mirror control switches shall be located within easy reach of the driver. The mirrors shall be manufactured using the finest quality non-glare glass and shall feature a rigid mounting reducing vibration. The mirrors shall be corrosion free under all weather conditions.

REARVIEW MIRROR REMOTE ACTIVATION

The driver's panel shall include activation for the rearview mirrors remote function. The driver panel shall also include a switch activating the mirrors to be heated.

CAB SINGLE TONE PAINT

The cab surface shall be thoroughly washed with grease cutting solvent (PPG DX330) prior to any sanding. The cab surface shall then be sanded and minor imperfections filled and sanded. The prepared surface shall then be washed again with (PPG DX330) to remove any contaminants from all surfaces to be painted.

The first coating to be applied shall be a pre-treat self-etching primer (PPG DX1787) (.5 to 1.0 dry film build) for maximum adhesion to the body material. The next two to four coats shall be an acrylic urethane primer resurfacing agent (PPG K38). The film build shall be 4-6 mils when dry. The primer coat, after appropriate dry time, shall be sanded with 320-600 grit sandpaper to ensure a maximum gloss finish. The last step shall be an application of at least three coats of PPG Concept acrylic urethane two-component color (single stage). The film build shall be 2-3 mils when dry. The single stage acrylic urethane, when mixed with component (PPG DCX61) catalyst shall provide a UV barrier to prevent fading and chalking.

The cab shall be painted one color, to be determined prior to the cab assembly.

The color paint code is PPG-FDG82546

Bidder Complies	
Yes	No

CAB UNDERCOAT

The cab shall have an undercoat applied prior to the cab being set on the running gear. The under coat shall be a waterborne, one-component, air dry undercoat formulated to prevent chipping, cracking and marring of painted or unpainted surfaces after exposure to high impact sand, gravel or other abrasive materials. It shall also have high corrosion resistance.

FRONT AXLE

A Meritor MFS Easy Steer non-drive axle shall be incorporated as the front axle for the chassis. The axle shall feature:

- A capacity of 20,000 pounds
- A 3.74" drop and a 71" king pin intersection (KPI)
- A conventional style hub with a standard knuckle

FRONT WHEEL BEARING LUBRICATION

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

FRONT SUSPENSION

The front suspension shall include a Hendrickson leaf spring suspension. The suspension shall feature:

- Capacity rating of 20,000 pounds
- 9 Leafs
- Case hardened threaded bushings
- A Grease fitting
- Double wrapped front eye

FRONT SHOCK ABSORBERS

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

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

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

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

POWER STEERING GEAR WITH ASSIST

The power steering gear shall be a TRW model TAS 85 and shall include the following:

- A balanced, hydraulic, positive displacement, sliding vane power steering pump which is gear driven from the engine
- One-piece, 2" diameter drag link for maintaining consistent wheel alignment resulting in less maintenance.
- The steering gear shall be mounted on a plane that is at a 9-degree angle in relationship to the center plane of the chassis. This mounting technique is designed to reduce the operating angle of input steering shafts. A more direct, responsive, and smoother handling vehicle will result from these unique design characteristics.

A certified torque and geometry study by TRW shall be available upon request.

CHASSIS ALIGNMENT

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

Alignment documentation shall be delivered with chassis.

FRONT AXLE CRAMP ANGLE

The chassis shall have a front axle cramp angle of 46 degrees to the left and right.

The manufacturer shall provide third party verification of cramp angle upon request from the fire department.

FRONT TIRES

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

The front tires shall feature:

- A stamped load capacity of 19,840 pounds per axle with a speed capacity of 65 miles per hour when properly inflated to 130 pounds per square inch

Bidder Complies	
Yes	No

FRONT WHEEL

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

FRONT BRAKES

The front brakes shall be Meritor EX225 Disc Plus disc brakes with 17" vented rotors.

The front brakes shall include brake chambers supplied by Meritor and shall be approved per application.

STEERING COLUMN AND WHEEL

The cab shall include a Douglas Autotech steering column. The steering column shall feature an 18", four (4) spoke steering wheel located at the driver's position; a seven (7) position tilt and 2.25" telescopic adjustment. The steering wheel shall be provided with a black vinyl cover with foam padding and a horn button, self-canceling turn signal switch, four-way hazard switch and headlamp dimmer switch. The steering column shall also incorporate a steering angle sensor.

REAR AXLE

A Meritor RS-24-160 driving axle shall be incorporated as the rear axle for the chassis. The axle shall feature:

- Rated capacity of 24,000 pounds
- Heavy duty Hypoid gearing for longer life, increased strength and quieter operation
- Industry-standard wheel ends for compatibility with both disc and drum brakes, and unitized oil seal technology to keep lubricant in and help prevent contaminant damage
- Rigid differential case for high axle strength and reduced maintenance
- Rugged Dependability
- Rectangular shaped, hot formed housing with a standard wall thickness of .50" at spring seat for extra strength and rigidity.

REAR AXLE DIFFERENTIAL LUBRICATION

The rear axle differential shall be lubricated with oil.

REAR WHEEL BEARING LUBRICATION

The rear axle wheel bearings shall be lubricated with oil.

Bidder Complies	
Yes	No

REAR SUSPENSION

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

The rear suspension capacity shall be rated at 24,000 pounds based on the capacity of the brakes and rear tires.

REAR BRAKES

The rear brakes shall be Meritor 16.50 inch X 7.00 inch S-cam drum type.

The rear brakes shall include brake chambers supplied by Meritor and shall be approved per application.

REAR BRAKE DUST SHIELDS

The rear brakes shall be equipped with brake dust shields.

REAR BRAKE SLACK ADJUSTERS

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

REAR SHOCK ABSORBERS

Shock absorbers shall be supplied by the suspension manufacturer and installed on the rear axle suspension.

REAR AXLE DIFFERENTIAL CONTROL

The rear axle shall include a driver controlled differential lock. This shall allow the main differential to be locked and unlocked when encountering poor road or highway conditions, where maximum traction is needed, for use at speeds no greater than 25 MPH.
The differential lock shall be controlled by a locking rocker switch on the driver's panel. The light on the switch shall illuminate with positive engagement of the differential control.

REAR AXLE DIFF. CONTROL ACTIVATION

The rear axle driver controlled locking differential control shall be activated through a switch on the driver's panel.

REAR TIRES

The rear tires shall be Michelin 11R 22.5 16PR “H” tubeless radial XDN2.

The rear tires shall feature:

- All weather tread designed for premier traction and mileage
- A stamped load capacity shall of 24,020 pounds per axle with a speed capacity of 75 miles per hour when properly inflated to 120 pounds per square inch

REAR WHEEL

The rear wheels shall be Alcoa hub piloted, heavy duty, and 22.50 inch x 8.25 inch aluminum wheels. Each outer wheel shall have a polished aluminum finish on the exterior surface and each inner wheel shall have a machine finish. The wheels shall be forged from a single piece of aluminum which shall be corrosion resistant, engineered to be lightweight and provide exceptional performance. The hub piloted mounting system shall provide easy installation and shall include two-piece flange nuts.

VEHICLE TOP SPEED

The top speed of the vehicle shall be programmed at approximately 70 MPH +/-2 MPH at governed engine RPM.

ELECTRONIC STABILITY CONTROL

Electronic stability control shall be supplied on the chassis.

BRAKE SYSTEM

A rapid build-up air brake system shall be provided. The air brakes shall include a two (2) air tank, three (3) reservoir system with a minimum of 4152 cubic inch of air capacity. A floor mounted treadle valve shall be mounted inside the cab for graduated control of applying and releasing the brakes. The system shall include an anti-compounding feature. All air reservoirs provided on the chassis shall be labeled for identification.

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

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

Additional safety shall be accommodated through Automatic Traction Control (ATC) which shall be installed on the single rear axle. The ATC system shall apply the ABS when the drive wheels loose

traction. The system shall scale the electronic engine throttle back to prevent wheel spin while accelerating on ice or wet surfaces.

The Electronic Stability Control (ESC) unit is a functional extension of the electronic braking system. It is able to detect any skidding of the vehicle about its vertical axis as well as any rollover tendency. The control unit comprises an angular-speed sensor that measures the vehicle's motion about the vertical axis, caused, for instance, by cornering or by skidding on a slippery road surface. An acceleration sensor measures the vehicle's lateral acceleration. The Controller Area Network (CAN) bus provides information on the steering angle. On the basis of lateral acceleration and steering angle, an integrated microcontroller calculates a theoretical angular speed for the stable vehicle condition.

The Meritor Wabco ABS and ESC system shall come with a three (3) year/300,000 mile parts and labor warranty.

MUD / SNOW SWITCH

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

AIR TANK BRACKETS

The air tank shall be mounted to the frame rail with brackets that are hot dipped galvanized thereby creating a barrier and cathodic protection from corrosion, and eliminating the requirement for finish paint and the subsequent requirements for touch up paint and/or total repaint after a period of time due to nicks, chips and corrosion. Powder coated or painted air tank brackets shall not be accepted. No exception.

PARK BRAKE

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

Park brake system shall include an anti-compounding feature.

PARK BRAKE CONTROL

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

The parking brake actuation valve shall be mounted on the driver's side dash to the right of the steering column within easy reach of the driver.

Bidder Complies	
Yes	No

AIR DRYER

The brake system shall include a Wabco System Saver 1200 Plus air dryer with an integral 100 watt heater with a Metri-Pack sealed connector. The system shall have an integrated purge volume and integrated governor.

The system shall have the following features:

- Premium desiccant provides greater water adsorption
- Replaceable spin on cartridge for simple maintenance
- Compact light weight design
- Pressure relief safety valve
- Turbo cut-off valve for boosted compressor applications
- Service components are external for easy replacement
- Common service components proven for reliability and quality
- Integrated with the air governor.

MOISTURE EJECTORS

Heated, automatic moisture ejectors with a manual drain provision shall be installed on all reservoirs of the air supply system. The manual drain provision shall include an actuation pull cable coiled and tied at each drain valve. The supplied cables when extended shall be sufficient in length to allow each drain to be activated from the side of the apparatus.

AIR SUPPLY LINES

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

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

AIR HORN RESERVOIR

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

Bidder Complies	
Yes	No

FRAME

The chassis frame shall consist of two (2) "C" style parallel rails, constructed of high strength low alloy and shall feature the following:

- A Domex **MODEL 110XF** 10.19" high by 3.63" deep cold rolled steel frame.
- Inner channel measuring 9.31" high x 3.25" deep x .25" thick
- The 10.19" frame height shall be maintained throughout the entire length of the frame to allow for maximum storage capacity for the entire apparatus.
- If frame rails that are larger than those specified are to be utilized, the maximum height of each frame rail shall not exceed 10.25" at any point on the frame rail. This will ensure the lowest possible vehicle center of gravity allowing maximum stability as well as providing the lowest body height possible.
- Frame rail shall have a consistent frame web throughout the entire length.
- The entire frame rail design shall be manufactured in the United States of America and readily available on the aftermarket.
- Grade 8 Yellow zinc coated fasteners, huck bolts shall not be acceptable
- Manufacturer's lifetime warranty

The frame ratings shall be as follows:

- 110,000 PSI minimum yield strength high strength low alloy steel
- Minimum Resisting Bending Moment (RBM) of 2,810,000 inch pounds per rail

To avoid frame cracking and failure over time, the top flange of the frame adjacent to the engine installation shall have a tapered design. Notches for engine components shall not be accepted due to fatigue and the potential for cracking.

UNDER FRAME REINFORCEMENT

An under slung frame reinforcement shall be installed below the frame rails in the transmission area to increase the vertical rigidity of the frame.

The under frame reinforcement provides:

- Enhanced handling
- Improved ride quality
- Increase resistance to frame and cross member fatigue
- Enhanced vehicle stability providing improved safety to occupants

CROSS MEMBERS

There shall be a minimum of seven (7) steel plate cross members installed on the apparatus.

Bidder Complies	
Yes	No

- 50,000 psi minimum yield strength steel plate cross members
- Manufacturer's lifetime warranty to match frame warranty. No Exceptions.
- Installed with one-piece cross member gusset to maximize vertical strength and minimize cross member flex

Crossmembers can be inverted when required to allow for PTO drive line installation without the need for notching or modifying the cross members in anyway. No Exceptions.

FRAME FINISH

The frame shall be powder coated to resist weather, dirt and other corrosive material.

ENGINE PLACEMENT

The engine shall be a maximum of 36" from the center line of the front axle to the front face of the engine block. The engine valve cover shall be a maximum of 23" from the top of the frame.

The engine placement shall provide optimal weight distribution to the front axle to enhance vehicle handling. More weight out in front of the front axle can cause a “fulcrum effect” and cause unsafe “bump steer” conditions.

The engine shall be mounted in a position that provides for the lowest possible height of the interior engine tunnel. An engine tunnel height from the floor of the chassis cab shall be no more than 21” high inside the cab.

Engine placement shall provide a minimum of 11” between the engine fan and radiator to maximize the airflow and cooling of the engine.

ENGINE

A Cummins ISL 9.0 liter, four-cycle diesel fueled, turbo charged engine shall feature the following:

- One of the highest power to weight ratios in its class
- Heavy-duty replaceable wet liners, roller followers, by-pass oil filtration with replaceable spin on cartridge and targeted piston cooling for longer service in tough work environments
- Improved cooled EGR system
- 543 Cubic inches of displacement
- High pressure common rail fuel system producing a precise quantity of fuel at ultra-high pressures
- Fully integrated, robust electronic engine controls

Bidder Complies	
Yes	No

- Electric fuel lift pump. No Exceptions.

The engine shall be coupled with a Holset VGT™ (Variable Geometry Turbocharger).

The engine shall be filled with Citgo brand Citgard 500 (or equivalent) SAE 15W40 CJ4 low ash engine oil for proper engine lubrication.

The engine shall be EPA certified to meet the 2013 emissions standards without compromising performance, reliability or durability using cooled exhaust gas recirculation and selective catalytic reduction technology.

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

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

AIR COMPRESSOR

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

AIR GOVERNOR

An air governor shall be provided to control the cut-in and cut-out pressures of the engine mounted air compressor. The governor shall be calibrated to meet FMVSS requirements. The air governor shall be integrated in the air dryer assembly.

HORSEPOWER

The engine shall have 450 horsepower at 2100 RPM, with a governed speed of 2200 RPM.

The engine shall have 1250 foot pounds of torque at 1400 RPM.

ENGINE FAN DRIVE

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

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

The clutch fan shall automatically engage in pump mode (when applicable).

Bidder Complies	
Yes	No

AUXILIARY ENGINE BRAKE

A Cummins engine compression brake, for the six (6) cylinder engine, shall be provided. The engine compression brake shall:

- Activate upon 0% accelerator when in operation mode and activate the vehicle's brake lights.

A cutout relay shall be installed to disable the compression brake when in pump mode or when an ABS event occurs.

TRANSMISSION PRE-SELECT

When the auxiliary brake is engaged, the transmission shall automatically shift to fourth gear to decrease the rate of speed. The transmission shall assist the secondary braking system, thereby slowing the vehicle.

AUXILIARY ENGINE BRAKE CONTROL

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

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

The auxiliary brake shall be controlled through an on/off switch and individual low/medium/high selector switches on the Driver's panel. The engine brake status shall be displayed through indicator lights on the dash panel in view of the driver.

ENGINE PROGRAMMING HIGH IDLE SPEED

A high idle switch will be provided, inside the cab, on the Driver's panel, that will automatically maintain a preset engine rpm. A switch will be installed, at the cab Driver's panel, for activation/deactivation.

The high idle will be operational only when the parking brake is set and the truck transmission is in neutral.

Bidder Complies	
Yes	No

ENGINE HIGH IDLE CONTROL

The vehicle shall be equipped with an automatic high-idle speed control. It shall be pre-set so when activated, it will operate the engine at the appropriate RPM to increase alternator output and optimize output of the HVAC system.

This device shall operate only when the master switch is activated and the transmission is in neutral with the parking brake set. The device shall disengage when the operator depresses the brake pedal, or the transmission is placed in gear, and shall be available to manually or automatically re-engage when the brake is set, or when the transmission is placed in neutral.

ENGINE AIR INTAKE

The engine air intake system shall include an ember separator air intake filter which shall be located behind the fascia.

The filter shall protect the downstream air filter from embers using a combination of unique flat and crimped metal screens constructed into a corrosion resistant steel frame.

This multilayered screen shall be designed to trap embers or allow them to burn out before passing through the pack, while creating only minimal air flow restriction through the system. Periodic cleaning or replacement of the screen shall be all that is required after installation.

The intake shall also feature a cyclone style water separator to remove unwanted moisture from incoming air.

The engine shall include an air intake filter which shall be bolted to the frame and located under the front of the cab. This dry type filter shall ensure dust and debris is safely contained inside the disposable housing, eliminating the chance of contaminating the air intake system during air filter service via a leak-tight seal.

The filter must have a capacity of no less than 1350 cubic feet of air per minute. The filter paper media must be of a flame retardant treated material. An electric air filter restriction indicator shall also be included with the system.

ENGINE EXHAUST SYSTEM

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

The system shall utilize 0.065 inch thick stainless steel exhaust tubing between the engine turbo and the DPF.

Bidder Complies	
Yes	No

The DPF, the decomposition tube, and the SCR canister through the end of the tailpipe shall all be connected with zero leak gasketed clamps. The discharge shall terminate horizontally on the right side of the vehicle ahead of the rear tires with an exhaust gas diffuser.

The diffuser shall lower exhaust gas temperatures during the regeneration cycle.

The DPF and SCR shall be mounted to the frame using brackets that shall be hot dipped galvanized there by creating a superior barrier from corrosion. Powder coated or painted brackets shall not be accepted.

DIESEL EXHAUST FLUID TANK

There shall be a molded cross linked polyethylene tank for the Diesel Exhaust Fluid (DEF). The tank shall have a capacity of not less than five (5) usable gallons and shall be mounted on the left hand side of the chassis frame in front of the batteries below the frame.

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

DIESEL EXHAUST FLUID TANK

There shall be an access door provided in the top rear step of left side crew area for access to the DEF tank.

ENGINE EXHAUST ACCESSORIES

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

ENGINE EXHAUST WRAP

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

DIESEL PARTICULATE FILTER CONTROLS

There shall be two (2) controls for the diesel particulate filter. One (1) control shall be for regeneration and one (1) control shall be for regeneration inhibit. Each switch shall be located in a covered location.

ENGINE COOLING SYSTEM

The radiator and the complete cooling system shall meet or exceed NFPA and engine manufacturer cooling system requirements.

The system shall include and feature the following:

Bidder Complies	
Yes	No

- A vertically stacked charge air cooler providing the maximum cooling capacity for the engine. Proposals offering horizontally stacked charge air cooler shall not be acceptable. No Exceptions
- The charge air cooler and radiator shall measure not less than 1382 square inches
- A one (1) piece nine (9) blade fan and shroud
- A surge tank with a low coolant probe and capable of removing entrained air from the cooling system
- Radiator re-circulation shields to prevent heated air from re-entering the cooling system and affecting performance
- Mounts allowing the entire radiator to drop through the frame for service when needed - No Exceptions
- Engine placement shall provide a minimum of 8" between the engine fan and radiator to maximize the airflow and cooling of the engine.
- A Spin on Element water filter with corrosion inhibitor shall be provided for the cooling system. No Exception.
- Shut off valves by the coolant filter shall be supplied. No Exception.

COOLANT HOSES

The cooling systems hose shall be formed silicone hose and formed aluminized steel tubing and include stainless steel constant torque band clamps.

ENGINE COOLANT

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

Supplemental coolant additives (SCA) are not required as this is part of the extended life coolant makeup.

ENGINE PUMP HEAT EXCHANGER

A single bundle type coolant to water heat exchanger shall be installed between the engine and the radiator. This pump heat exchanger shall circulate water from the fire pump to the heat exchanger thereby reducing the temperature of the coolant for the engine. The heat exchanger shall be designed to prohibit water from the pump from coming in contact with the engine coolant.

Bidder Complies	
Yes	No

TRANSMISSION

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

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

The transmission shall include prognostic diagnostic capabilities. These capabilities shall include the monitoring of the fluid life, filter change indication, and transmission clutch maintenance.

The transmission gear ratios shall be:

1st 3.49:1
2nd 1.86:1
3rd 1.41:1
4th 1.00:1
5th 0.75:1
6th 0.65:1 (if applicable)
Rev 5.03:1

TRANSMISSION COOLING SYSTEM

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

TRANSMISSION DRAIN PLUG

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

TRANSMISSION FLUID

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

TRANSMISSION SHIFT SELECTOR

An Allison GEN V pressure sensitive range selector touch pad shall be provided and located on the tunnel to the right of the driver.

The shift selector shall provide an indicator on the digital display and shall alert the driver/operator when a specific maintenance function is required.

Bidder Complies	
Yes	No

TRANSMISSION MODE PROGRAMMING

The transmission, upon start-up, will automatically select a four (4) speed operation. The fifth speed over drive shall be available with the activation of the mode button on the shifting pad.

TRANSMISSION PROGRAMMING

The EVS group package number 127 shall contain the 198 vocational package for the fire service for this apparatus as a Pumper. This package shall incorporate an automatic neutral with selector override. This feature commands the transmission to neutral when the park brake is applied, regardless of drive range requested on the shift selector which requires re-selecting the drive range to shift out of neutral for the override.

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

An eight (8) pin diagnostic connector will be provided next to the steering column.

The trans. module shall contain the following circuits:

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

DRIVELINE

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

Any carrier bearing brackets that are utilized on the apparatus shall be hot dipped galvanized as to provide a superior barrier and cathodic protection from corrosion. Proposals offering powder coated or painted brackets shall not be accepted. No exception.

FUEL SYSTEM

The fuel tank shall have a capacity of fifty (50) gallons/one hundred eighty-nine (189) liters and shall measure 35.00 inches in width X 15.00 inches in height X 24.00 inches in length. The tank shall offer:

- A vent port which will facilitate venting to the top of the fill neck for rapid filling without any "blow-back"

Bidder Complies	
Yes	No

- One (1) 2” NPT fill port for left hand fill with a .5” NPT drain plug centered side to side 9" from the front of the tank
- A roll over ball check vent for temperature related fuel expansion and draw
- A design including dual draw tubes and sender flanges
- A baffled design and shall be constructed of steel
- An exterior painted with a PRP Corsol™ black anti-corrosive exterior metal treatment finish which offers external corrosion resistance

The fuel tank shall be mounted below the frame, behind the rear axle. There shall be two (2) three-piece strap hanger assemblies with “U” straps bolted midway on the fuel tank, allowing the tank to be easily lowered and removed for service purposes.

The strap hanger material shall be stainless steel. No Exceptions.

For isolation of vibration and movement, rubber isolating pads shall be provided between the tank and the hanger strap assemblies. The tank straps shall be attached to rubber coated cross members which help isolate the tank from frame flex.

Strap mounting studs through the rail, hidden behind the body shall not be acceptable.

All fuel lines shall be connected with steel fittings with all fittings pointed towards the right side (curbside) of the chassis.

The chassis fuel lines shall feature an additional 4’ of length provided so the tank can be easily lowered and removed for service purposes which shall be coiled and secured at the top of the tank.

FUEL FILTER/WATER SEPARATOR

The fuel system shall have a Fleetguard FS1065 fuel filter/water separator as a primary filter. The fuel filter shall have a drain valve.

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

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

FUEL LINES

The fuel system supply and return lines installed from the fuel tank to the engine shall be black aramid braided lines with a fiber outer braid. The fuel lines shall connected with reusable steel fittings. Fuel line is compatible with bio-fuel blends.

Bidder Complies	
Yes	No

FUEL SHUTOFF VALVE

Two (2) fuel shutoff valves shall be installed at the fuel filter to allow the fuel filter to be changed without loss of fuel to the fuel pump.

FUEL COOLER

The cross flow air to fuel cooler shall be all aluminum and shall be provided to lower fuel temperature allowing the vehicle to operate at higher ambient temperatures. The fuel cooler shall be located behind the battery box, under the frame.

The fuel cooler shall incorporate a fan for improved heat transfer.

The fuel cooler shall be mounted to the frame using hot dipped galvanized brackets. Powder coated or painted brackets shall not be acceptable. No exception.

ALTERNATOR

The charging system shall include a 270 amp Leece Neville 12 volt alternator. The alternator shall include a self-excited integral regulator.

ELECTRICAL SYSTEM

There shall be a 12 volt direct current single starting electrical system providing power to all components for the cab and chassis. The system shall feature:

- 300 degree Fahrenheit high temperature, flame retardant loom
- All SAE wiring color coded and labeled as to its function
- Wiring which is cross link with 311 degree Fahrenheit insulation
- A suppressed system in accordance with SAE J551

The primary power distribution will be located forward of the officer's seating position and be easily accessible while standing on the ground for simplified maintenance and troubleshooting. Additional electrical distribution centers will be provided throughout the vehicle to house the vehicle's electrical power, circuit protection, and control components. The electrical distribution centers will be located strategically throughout the vehicle to minimize wire length. For ease of maintenance, all electrical distribution centers will be easily accessible. All distribution centers containing fuses, circuit breakers and/or relays will be easily accessible.

Circuit protection devices, which conform to SAE standards, will be utilized to protect electrical circuits. All circuit protection devices will be rated per NFPA requirements to prevent wire and component damage when subjected to extreme current overload.

General protection circuit breakers will be a combination of automatic and manual reset breakers. This will provide a durability and capacity maximization of the electrical system. When required, automotive

type fuses will be utilized to protect electronic equipment. Control relays and solenoid will have a direct current rating of 125 percent of the maximum current for which the circuit is protected per NFPA.

EMI/RFI PROTECTION

To prevent erroneous signals from crosstalk contamination and interference, the electrical system will meet, at a minimum, SAE J551/2, thus reducing undesired electromagnetic and radio frequency emissions. An advanced electrical system will be used to ensure radiated and conducted electromagnetic interference (EMI) or radio frequency interference (RFI) emissions are suppressed at their source.

The apparatus will have the ability to operate in the electromagnetic environment typically found in fire ground operations to ensure clean operations. The electrical system will meet, without exceptions, electromagnetic susceptibility conforming to SAE J1113/25 Region 1, Class C EMR for 10KHz-1GHz to 100 Volts/Meter. The vehicle OEM, upon request, will provide EMC testing reports from testing conducted on an entire apparatus and will certify that the vehicle meets SAE J551/2 and SAE J1113/25 Region 1, Class C EMR for 10 KHz-1GHz to 100 Volts/Meter requirements. Component and partial (incomplete) vehicle testing is not adequate as overall vehicle design can impact test results and thus is not acceptable by itself.

EMI/RFI susceptibility will be controlled by applying appropriate circuit designs and shielding. The electrical system will be designed for full compatibility with low-level control signals and high-powered two-way radio communication systems. Harness and cable routing will be given careful attention to minimize the potential for conducting and radiated EMI/RFI susceptibility.

ELECTRICAL HARNESSING INSTALLATION

To ensure rugged dependability, all wiring harnesses installed by the apparatus manufacturer will conform to the following specifications:

SAE J1128 - Low tension primary cable

SAE J1292 - Automobile, truck, truck-tractor, trailer and motor coach wiring

SAE J163 - Low tension wiring and cable terminals and splice clips

SAE J2202 - Heavy duty wiring systems for on-highway trucks

NFPA 1901 - Standard for automotive fire apparatus

FMVSS 302 - Flammability of interior materials for passenger cars, multipurpose passenger vehicles, trucks and buses

SAE J1939 - Serial communications protocol
SAE J2030 - Heavy-duty electrical connector performance standard
SAE J2223 - Connections for on board vehicle electrical wiring harnesses NEC - National Electrical Code
SAE J561 - Electrical terminals - Eyelet and spade type
SAE J928 - Electrical terminals - Pin and receptacle type A

For increased reliability and harness integrity, harnesses will be routed throughout the cab and chassis in a manner which allows the harnessing to be laid into its mounting location. Routing of harnessing which requires pulling of wires through tubes will not be allowed.

Wiring will be run in loom or conduit where exposed, and have grommets or other edge protection where wires pass through metal. Wiring will be color, function and number coded. Wire colors will be integral to each wire insulator and run the entire length of each wire. Harnessing containing multiple wires and uses a single wire color for all wires will not be allowed. Function and number codes will be

continuously imprinted on all wiring harness conductors at 3.00" intervals. All wiring installed between the cab and into doors will be protected by an expandable rubber boot to protect the wiring. Exterior exposed wire connectors will be positive locking, and environmentally sealed to withstand elements such as temperature extremes, moisture and automotive fluids.

Electrical wiring and equipment will be installed utilizing the following guidelines:

- All wire ends not placed into connectors will be sealed with a heat shrink end cap. Wires without a terminating connector or sealed end cap will not be allowed.
- All holes made in the roof will be caulked with silicon. Large fender washers, liberally caulked, will be used when fastening equipment to the underside of the cab roof.
- Any electrical component that is installed in an exposed area will be mounted in a manner that will not allow moisture to accumulate in it. Exposed area will be defined as any location outside of the cab or body.
- For low cost of ownership, electrical components designed to be removed for maintenance will be quickly accessible. For ease of use, a coil of wire will be provided behind the appliance to allow them to be pulled away from the mounting area for inspection and service work.
- Corrosion preventative compound will be applied to non-waterproof electrical connectors located outside of the cab or body. All non-waterproof connections will require this compound in the plug to prevent corrosion and for easy separation of the plug.
- Any lights containing non-waterproof sockets in a weather-exposed area will have corrosion preventative compound added to the socket terminal area.
- All electrical terminals in exposed areas will have protective Coating applied completely over the metal portion of the terminal.
- Rubber coated metal clamps will be used to support wire harnessing and battery cables routed along the chassis frame rails.
- Heat shields will be used to protect harnessing in areas where high temperatures exist. Harnessing passing near the engine exhaust will be protected by a heat shield.
- Cab and crew cab harnessing will not be routed through enclosed metal tubing. Dedicated wire routing channels will be used to protect harnessing therefore improving the overall integrity of the vehicle electrical system. The design of the cab will allow for easy routing of additional wiring and easy access to existing wiring.
- All braided wire harnesses will have a permanent label attached for easy identification of the harness part number and fabrication date.
- All standard wiring entering or exiting the cab will be routed through sealed bulkhead connectors to protect against water intrusion into the cab.

BATTERY CABLE INSTALLATION

All 12-volt battery cables and battery cable harnessing installed by the apparatus manufacturer will conform to the following requirements:

SAE J1127 - Battery Cable
SAE J561 - Electrical terminals, eyelets and spade type
SAE J562 - Nonmetallic loom
SAE J836A - Automotive metallurgical joining

Bidder Complies	
Yes	No

SAE J1292 - Automotive truck, truck-tractor, trailer and motor coach wiring
NFPA 1901 - Standard for automotive fire apparatus
Battery cables and battery cable harnessing will be installed utilizing the following guidelines:

- All battery cables and battery harnesses will have a permanent label attached for easy identification of the harness part number.
- Splices will not be allowed on battery cables or battery cable harnesses.
- For ease of identification and simplified use, battery cables will be color coded. All positive battery cables will be red in color or wrapped in red loom the entire length of the cable. All negative battery cables will be black in color.
- For increased reliability and reduced maintenance, all electrical buss bars located on the exterior of the apparatus will be coated to prevent corrosion.
-

ELECTRICAL COMPONENT INSTALLATION

All lighting used on the apparatus will be, at a minimum, a two (2) wire light grounded through a wired connection to the battery system. Lights using an apparatus metal structure for grounding will not be allowed.

An operational test will be conducted to ensure that any equipment that is permanently attached to the electrical system is properly connected and in working order. The results of the tests will be recorded and provided to the purchaser at time of delivery.

DRIVER SWITCH PANEL

The driver panel to the right of the Driver's position shall include the following:

- In the upper most row it shall have the HVAC Controls, which shall include three (3) controls, the fan speed, comfort and defrost control, and temperature control. In the far right position shall be the seat belt indicator.
- In the middle section there shall be eight (8) backlit switches, the switch closest to the driver shall be the Emergency Master switch, and the switch on the far right side shall be a high idle switch leaving six (6) blank switches in between for customer applications.
- In the bottom row there shall be six (6) switches. These switches shall be configured in the following order starting with the switch closest to the driver, headlight switch, dimmer switch, wiper control, engine brake on/off switch, with 2 blank switches on the far right side for customer application.

MASTER WARNING SWITCH

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

Bidder Complies	
Yes	No

CAB INSTRUMENTATION

The instrumentation panel within the cab shall feature a Pacific Insight gauge panel which shall include three (3) 5"diameter information centers, telltale indicator lamps, control switches, alarms, and a LCD diagnostic panel.

The gauges shall be easy to read including red backlighting.

The instrument panel shall contain the following gauges and indictors:

The middle information center shall include:

- A programmable speedometer to read either 0 to 140 MPH or 0 to 140 KM/H
- An amber telltale lamp indicating the Check Engine
- An amber telltale lamp indicating MIL Engine Emissions System Malfunction
- A red telltale lamp indicating Stop Engine
- A tachometer gauge with 0-3,000 RPM

The right hand side information center shall include:

- A gauge to display the engine oil pressure with high and low level indicators and stop engine alarm
- A fuel level gauge with a low fuel indicator and alarm
- An LED bar displaying 4 stages of the level for the Diesel Exhaust Fluid (DEF) with a refill indicator
- A voltage gauge with low voltage indicator
- A water temperature gauge with high water temp indicator and alarm

The left hand side information center shall include:

- A primary air PSI gauge including low air and high air warning displays
- A secondary air PSI gauge with low and high air warning indication

An LCD diagnostic display, located in the left hand side information center shall include digital readouts for the following:

- Odometer
- Transmission oil temp
- Engine oil temp
- Speedometer
- Engine hours
- Engine and transmission code
- Exhaust temp
- Engine coolant temp
- Engine oil PSI
- Turbo boost PSI

Bidder Complies	
Yes	No

- Primary air pressure
- Secondary air pressure
- Engine load %
- Engine torque
- Battery volts
- Fuel level %
- Vehicle speed
- RPM
- DEF level
- Instant fuel economy
- Average fuel economy
- Engine hours
- Capable to record four trips, each shall be include:
    - · Trip distance
    - · Fuel economy
    - · Fuel used
    - · Idle fuel used
- The LCD screen shall also provide diagnostic capability

To promote safety, the following telltale indicator lamps will be integral to the gauge assembly and are located below the middle information center. The indicator lamps will be "dead-front" design that is only visible when active. The colored indicator lights will have descriptive text or symbols. The following indicator lamps shall be located on the Telltale panel:

BLUE Indicator Lights

- High Beam Headlight

GREEN Indicator Lights

- Right Turn Indicator
- Left Turn Indicator
- Battery On (Always On)

YELLOW Indicator Lights

- Particle Filter Regeneration (DPF)
- Regeneration Inhibit (Switch Engaged)
- Check Transmission

- Air Intake Restriction
- High Exhaust System Temperature (HEST)
- Wait to Start
- ATC (Automatic Traction Control) (when applicable)
- Water in Fuel

RED Indicator Lights

- Low Engine Coolant Level
- Air Bag Warning (when applicable)
- High Transmission Temperature
- ABS
- Parking Brake

ALARMS

Audible steady tone warning alarm: A steady audible tone alarm will be provided whenever a warning message is present.

Alarm silence: Any active audible alarm will be able to be silenced with a button on the right side of the LCD screen.

INDICATOR LAMP AND ALARM PROVE-OUT

Telltale indicators and alarms will perform prove-out at initial power-up to ensure proper performance.

DIAGNOSTIC PANEL

A diagnostic panel shall be accessible while standing on the ground and located inside the driver's side door, left of the steering column. The diagnostic panel shall allow diagnostic tools such as computers to connect to various vehicle systems for improved trouble shooting providing a lower cost of ownership. Diagnostic switches shall allow engine and ABS systems to provide blink codes should a problem exist.

The diagnostic panel shall include the following:

- Engine diagnostic port
- Transmission diagnostic port
- ABS diagnostic port
- SRS diagnostic port (when applicable)
- V-Mux USB diagnostic port (when applicable)
- Engine diagnostic switch (blink codes flashed on check engine telltale indicator)
- Diesel particulate filter regeneration switch (when applicable)
- Diesel particulate filter regeneration inhibit switch (when applicable)

Bidder Complies	
Yes	No

BACKLIGHTING COLOR

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

VEHICLE DATA RECORDER

Apparatus shall be equipped with a Class1 "Vehicle Data Recorder (VDR) that is connected to the power train CAN (Controller Area Network) bus consisting of transmission (TCM), engine control (ECM) and anti-lock brake (ABS) modules mounted on the apparatus. The VDR will function per NFPA 1901-2009 sections 4.11 (Vehicle Data Recorder) utilizing the power train s J1939 data.

The VDR data shall be downloadable by USB cable to a computer using either Microsoft ™ or Apple ™ Operating Systems using Class 1/ O.E.M. supplied reporting software. The latest version of the software shall be available by contacting Class 1.

The apparatus shall be equipped with a Class1 Seat Belt Warning System" (SBW) that is connected to the power train CAN (Controller Area Network) bus consisting of transmission (TCM), engine control (ECM) and anti-lock brake (ABS) modules mounted on the apparatus. The SBW will function per NFPA 1901-2009 14.1.3.10 (Seat Belt Warning) using the Class1 "Seat Belt Input Module" for seat occupied and belt status information.

The SBW system shall have the ability to use either normally open (NO) or normally closed (NC) switches (user selectable by "dip switches" at ground potential) for operation.

BATTERIES

The single start electrical system shall include four (4) 700 CCA batteries.

The batteries shall feature:

- A 180 minute reserve capacity
- 4/0 welding type dual path starter cables per SAE J541
- Heat shrink and sealant encapsulated ends on the cables

BATTERY COMPARTMENTS

A well ventilated battery storage compartment shall house the batteries on the officer and driver side of the chassis and shall be located so as to offer easy access to the batteries when the cab is tilted.

The each battery compartment shall feature a painted battery box with cover.

BATTERY CABLES

The starting system shall include cables which shall be protected by a 275 degree F, minimum high temperature flame retardant loom.

The loom shall be sealed to keep out dirt, dust and debris.

Bidder Complies	
Yes	No

BATTERY JUMPER STUD

The starting system shall include battery jumper studs.

These studs shall be located in the forward most portion of the driver's side lower step.

The studs shall allow the vehicle to be jump started, charged, or the cab to be raised in an emergency in the event of battery failure.

IGNITION

A master battery system with a keyless start ignition system shall be provided. Each system shall be controlled by a Land & Sea brand two position switch, of which shall be mounted on the left side driver kick panel.

A push button type starter button shall be provided on the driver dash to the left of the steering wheel.

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

POWER & GROUND STUD

An electrical distribution panel shall include two (2) power studs. The studs shall be size #10 and each of the power studs shall be circuit protected with a fuse of the specified amperage. One (1) power stud shall be capable of carrying up to a 40 amp battery direct load. One (1) power stud shall be capable of carrying up to a 15 amp ignition switched load. The two (2) power studs shall share one (1) #10 ground stud.

GROUND LIGHTS

Each door shall include a Whelen 3SC0CDCR LED NFPA compliant ground light mounted to the underside of the cab step below each door.

Each light shall include a polycarbonate lens, a housing which is vibration welded and a bulb which shall be shock mounted for extended life.

GROUND LIGHT ACTIVATION

The ground lights shall activate when the park brake is engaged.

CAB STEP LIGHTING

One (1) LED light shall be mounted to the riser of the middle cab step, a total of eight (8) step lights for the cab, in accordance with NFPA.

Each light shall include a polycarbonate lens and shall be contained in a housing which is vibration welded with a bulb which shall be shock mounted. Each step light shall not be any larger than 3" in diameter.

The step lighting shall activate by opening any of the cab doors.

Bidder Complies	
Yes	No

INTERIOR DOOR WARNING LIGHTS

The interior of each door shall include one (1) red 4"rectangular LED warning light located on the door panel. Each light shall activate with a flashing pattern when the door is in the open position to serve as a warning to oncoming traffic.

ENGINE COMPARTMENT LIGHTING

Two (2) LED lights shall be mounted to the engine compartment in such a fashion as to provide as much light as possible to the engine compartment area. The engine compartment lighting shall activate with the tilting of the cab.

INTERIOR OVERHEAD CAB LED LIGHTING

Each cab door shall include a dual red and white LED lamp. There shall be one (1) light centered over each of the Driver and Officer's seat and one centered over each crew door.

The clear lamp shall illuminate with the opening of each respective door with both the red and clear portions of the lamp activated by individual lighted switches on each lamp.

DOOR OPEN/HAZARD WARNING LIGHT

One (1) red flashing, warning light shall be provided and installed in the driver's compartment to indicate an open passenger or apparatus compartment door. The warning light shall also be attached to folding equipment racks and light towers as specified. The light shall be a flashing rectangular incandescent marker light with a red lens and shall be properly marked and identified.

Per NFPA 13.11.4, the hazard light shall be marked w/ a sign/tag that reads, "DO NOT MOVE APPARATUS WHEN LIGHT IS ON".

BACK-UP ALARM

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

Bidder Complies	
Yes	No

APPARATUS WARNING PROVISIONS SPECIFICATIONS

ELECTRIC SIREN

One (1) Code 3 Model #3692 V-Con electronic siren shall be mounted in the cab. The unit shall feature an electronic air horn, wail, yelp, hi-lo siren and shall have a hard wired microphone.

SPEAKER

One (1) Federal Signal DynaMax Model #ES100 100-watt speaker shall be installed. The black aluminum speaker shall include a polished trim #ESFMT.

SPEAKER

One (1) stainless steel grille shall be installed on the speaker.

SPEAKER LOCATION

The siren speaker shall be installed on the apparatus bumper extension, as determined by the body manufacturer.

FEDERAL MECHANICAL SIREN

One (1) Federal Signal Q2B mechanical siren shall be recess mounted into the left side of the front bumper. The "Q" siren shall feature a highly polished chrome body and grille. The siren's distinctive mechanical wail sound shall produce 123 db at 10'.The siren control switch (es) shall be installed in the cab.

SIREN CONTROL

One (1) foot switch shall be provided on the driver's side of the cab floor to activate the Federal Signal Q2B siren.

SIREN CONTROL

One (1) foot switch shall be provided on the officer's side of the cab floor to activate the Federal Signal Q2B siren.

SIREN BRAKE

One (1) push button siren brake to silence the Federal Signal Q2B siren shall be provided on the officer's side dash.

LIGHTBAR

One (1) Whelen NFPA Edge Ultra Freedom light bar shall be included with the apparatus cab. The light bar shall be model FN72QLED and shall be mounted on the roof of the cab towards the front, above the windshield.

Bidder Complies	
Yes	No

The light bar shall feature:

- A 72” light bar designed for high performance
- Two (2) front corner red linear LED light heads
- Four (4) front linear LED light heads, two (2) red and two (2) white
- Two (2) end red linear LED light heads with square ends
- A lens configuration of red/ clear/ red to offer the most ultra-bright, ultra-wide angle impact
- Designed in accordance with NFPA Zone A lighting requirements

LIGHTBAR ACTIVATION

The front upper light bar activation shall be wired into the master warning switch.

UPPER REAR WARNING LIGHTS

One (1) pair of Whelen model #L31H Super LED beacons shall be installed, one each side on the upper rear of the apparatus body. The unit shall have dimensions of 4" high x 7-9/16" deep and shall have a red lens.

REAR WARNING LIGHT MOUNTING

The upper rear lights shall be mounted on cast aluminum stanchions attached to the apparatus body, one on each side.

UPPER WING FRONT WARNING LIGHTS

One (1) pair of Whelen model M6 LED warning lights shall be installed, one each side one the front of the chassis cab upper grille area. The dimensions of the lights shall be 4-5/16" x 6-3/4".

There shall be chrome bezels supplied and installed on the warning lights.

LOWER FRONT WARNING LIGHTS

One (1) pair of Whelen model 600 super LED's warning lights shall be installed, one each side one the front of the chassis cab, inboard of the turn signals. The dimensions of the lights shall be 4" x 6".

INTERSECTION WARNING LIGHTS

One (1) pair of Whelen model #600 red Super LED warning lights shall be installed one each side of the chassis cab. The dimensions of the lights shall be 4" x 6".

There shall be chrome bezels supplied and installed on the warning lights.

LOWER MID-CHASSIS WARNING LIGHTS

Two (2) Whelen model #600 red Super LED warning lights shall be installed on the lower side of the mid-chassis. The dimensions of the lights shall be 4" x 6".

Bidder Complies	
Yes	No

The specified lights shall be installed over the front wheel well.

There shall be chrome bezels supplied and installed on the warning lights.

LOWER MID BODY WARNING LIGHTS

One (1) pair of Whelen model #500 surface mounted red Super LED warning lights shall be installed, one each side of the apparatus, mid-body. The dimensions of the lights shall be 1-5/8" x 5" x1".

The specified lights shall be installed in the rub rail.

There shall be chrome bezels supplied and installed on the warning lights.

LOWER REAR SIDE WARNING LIGHTS

One (1) pair of Whelen model #500 surface mounted red Super LED warning lights shall be installed, one each side of the apparatus body, towards the rear of the body. The dimensions of the lights shall be 1-5/8" x 5" x1".

The specified lights shall be installed in the rub rail.

There shall be chrome bezels supplied and installed on the warning lights.

LOWER REAR WARNING LIGHTS

One (1) pair of Whelen model #600 red Super LED warning lights shall be installed, one each side on the lower rear of the apparatus body. The dimensions of the lights shall be 4" x 6".

The specified lights shall be installed in the DOT lighting bezel.

Bidder Complies	
Yes	No

APPARATUS 12 VOLT ELECTRICAL SPECIFICATIONS

LOW VOLTAGE ELECTRICAL SYSTEM SPECIFICATIONS

The electrical system shall include all panels, electrical components, switches and relays, wiring harnesses and other electrical components. The electrical equipment installed by the apparatus manufacturer shall conform to current automotive electrical system standards, the latest Federal DOT standards, and the requirements of the applicable NFPA standards.

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

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

The wiring between the cab and body shall be joined using Deutsche type connectors or an enclosed in a terminal junction panel area. This system will permit body removal with minimal impact on the apparatus electrical system. All connections shall be crimp-type with insulated shanks to resist moisture and foreign debris such as grease and road grime. Weather-resistant connectors shall be provided throughout to ensure the integrity of the electrical system.

There shall be no exposed electrical cabling, harnesses, or terminal connections located in compartments, unless they are enclosed in a junction box or covered with a removable electrical panel. The wiring shall be secured in place and protected against heat, liquid contaminants and damage. Wiring shall be uniquely identified every three-inches (3") by color coding or permanent marking with a circuit function code and identified on a reference chart or electrical wiring schematic per requirements of applicable NFPA #1901 standards.

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

The electrical system shall include the following:

- Electrical terminals in weather exposed areas shall have a non-conductive grease or spray applied. A corrosion preventative compound shall be applicable to all terminal plugs located

outside of the cab or body.

- The electrical wiring shall be harnessed or be placed in a protective loom.
- Holes made in the roof shall be caulked with silicone. Large fender washers shall be used when fastening equipment to the underside of the cab roof.
- Any electrical component that is installed in an exposed area shall be mounted in a manner that will not allow moisture to accumulate in it.
- A coil of wire must be provided behind an electrical appliance to allow them to be pulled away from mounting area for inspection and service work.
- All lights that have their sockets in a weather exposed area shall have corrosion preventative compound added to the socket terminal area.

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

A single warning light switch shall activate all required warning lights. This switch will allow the vehicle to respond to an emergency and "call for the right of way". When the parking brake is applied, a "blocking right of way" system shall automatically activate per requirements of the applicable NFPA standards. All "clear" warning lights shall be automatically turned off upon application of the parking brake.

NFPA REQUIRED TESTING OF ELECTRICAL SYSTEM

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

1. Reserve capacity test:

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

2. Alternator performance tests at idle:

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

be considered a test failure.

3. Alternator performance test at full load:

The total continuous electrical load shall be activated with the engine running up to the engine manufacturer's governed speed. The test duration shall be a minimum of two (2) hours. Activation of the load management system is permitted during this test. However, if an alarm sounds due to excessive battery discharge, as detected by the system requirements in the NFPA standards, or a system voltage of less than 11.7 volts dc for more than 120 seconds is present, the test has failed.

4. Low voltage alarm test:

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

NFPA REQUIRED DOCUMENTATION

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

a. Documentation of the electrical system performance tests required above.

b. A written load analysis, including:

1. The nameplate rating of the alternator.

2. The alternator rating under the conditions.

3. Each specified component load.

4. Individual intermittent loads.

WEATHER RESISTANT ELECTRICAL JUNCTION BOX

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

LOAD MANAGER 2

The apparatus shall be equipped with a Kussmaul model 091-79 Automatic Load Shedding System for performing continuous electrical load management. The Load Manager shall have the following features:

- Monitor 12-volt system and detect low voltage.

- Capability to control two (2) loads.
- Automatic reset when voltage rises.
- Adjustable voltage set point.

The load manager shall be protected against reverse polarity and shorted outputs, and be enclosed in a enclosure to enhance EMI/RFI protection. The manufacturer shall provide for all electrical loads in excess of the NFPA minimum electrical requirements that exceed the alternator output.

DASH MOUNTED EMERGENCY ELECTRICAL SWITCH PANEL

An electrical switch panel shall be designed and mounted in the cab dash area. All switches shall be provided with backlighted snap-in legend inserts.

SWITCHES

All emergency light switches shall be lighted, rocker style. Switches shall be internally lit when the switch circuit is in the on position. A plug-in identification label is to be provided and installed adjacent to each rocker switch with backlighting provided behind the label.

An internally lighted "master" switch shall be provided and wired through a heavy-duty relay to activate power to the emergency lights.

BATTERY CHARGER AND AIR COMPRESSOR

One (1) Kussmaul Pump Plus 1200 model #091-187-12-R-B1 battery charger and air compressor system shall be installed. The 120 volt compressor system shall be designed to maintain the air pressure in the chassis brake system whenever the pressure drops below a predetermined level.

The battery charger shall be supplied from the 120 volt shore power receptacle and be a fully automatic high output charging system. The unit shall be mounted in a clean dry area and will be accessible for service and/or maintenance.

BATTERY CHARGER DISPLAY

One (1) Kussmaul single battery bank voltage display shall be supplied with the charger.

AUTO-EJECT

A Kussmaul "Super Auto-Eject" 20-amp automatic disconnect device shall be provided and installed on the 110 volt shoreline connection complete with weatherproof cover and matching plug. The Auto-Eject shall be activated by the chassis starter switch to disconnect the plug. The Super Auto-Eject shall be completely sealed to prevent contamination of the mechanism by inclement weather and road conditions. The Super Auto-Eject shall have an internal switch to open and close the AC circuit after the mating connector is inserted and before the connector is removed.
The Auto-Eject shall be installed over the left front wheel well.

Bidder Complies	
Yes	No

SHORE POWER PLUG

The shore power plug shall be located over the left front wheel of the custom chassis.

AIR HORNS

Two (2) 24.5" Stuttertone chrome plated air horns shall be recess mounted into the front bumper with one positioned on each side. An air protection valve shall be provided in the air horn piping that will not allow the chassis air brake system to drop below 90 PSI.

ELECTRIC TRAFFIC HORN AND AIR HORN SELECTOR SWITCH

One (1) selector switch shall be provided on the cab's dash that will allow the chassis steering wheel horn button to activate either the electric traffic horn or air horn system.

AIR HORN FOOT SWITCH

One (1) foot switch shall be installed to activate the air horn system on the officer's side of the floor.

PUMP ENCLOSURE LIGHTS

One (1) incandescent work light shall be provided in the pump enclosure.

The control switch shall be mounted on the light head.

HAND LIGHTS

All NFPA required portable hand lights supplied by the Customer must be installed before the apparatus is placed into service.

PORTABLE LANTERN

Four (4) Streamlight “Vulcan” LED portable handlight shall be installed. The lantern shall include a mounting bracket, with 12 volt charger wired to the battery system to allow the light to recharge when not in use.

HANDLIGHT INSTALLATION

The location of the handlight installation shall be in the chassis cab. All components shall be installed as directed by the fire department.

The mounting locations shall be determined at the pre-construction conference.

RADIO ANTENNA BASE

Two (2) radio antenna bases shall be supplied and installed on the apparatus, the antenna coax terminating in the cab. The location shall be determined by the customer.

Bidder Complies	
Yes	No

RADIO

Two (2) fire radios shall be supplied by the customer and installed on the apparatus. The location shall be determined by the customer.

12 VOLT POWER SOURCE

Two (2) 12 volt power and ground connection rated at 30 amps shall be provided on the apparatus for the installation of a mobile two-way radio.

The power source shall be run through the chassis master battery switch and shall be deactivated when the master switch is in the "OFF" position.

RADIO SPEAKER

Two (2) fire radio speakers shall be supplied by the customer and installed on the apparatus. The location shall be determined by the customer.

KNOX BOX

One (1) Key Secure master key box shall be supplied by the customer and installed. The location shall be determined by the customer.

MARKER LIGHTS

LED marker lights shall be installed on the vehicle in conformance to the Department of Transportation requirements.

LICENSE PLATE BRACKET

One (1) license plate bracket shall be provided at the rear bumper. The bracket shall have a light and shall be chrome plated.

TAIL LIGHTS

Two (2) Whelen LED tail/brake lights shall be provided. The rectangular 4"x6" light shall be red.

TURN SIGNALS

Two (2) Whelen turn signals shall be provided. The rectangular LED light shall be 4" x 6" in dimension.

BACKUP LIGHTS

Two (2) Whelen Series 600 LED backup lights shall be installed on the rear of the apparatus body. The dimensions shall be 4" x 6" and the lens color shall be clear.

Bidder Complies	
Yes	No

FOUR LIGHT BEZEL

Two (2) tail light cluster bezels shall be supplied. Each bezel shall be designed to hold the specified rear lights located at the lower rear corners of the body.

MID BODY LED TURN SIGNALS

Two (2) mid body LED turn signals shall be provided. The location of the turn lights shall be at mid-body near the rear wheel axle.

PUMP PANEL GROUND LIGHTS

Two (2) LED ground lights shall be installed under the pump panel running boards. One (1) light shall be located on the driver's side and one (1) light located on the officer's side of the apparatus.

REAR STEP GROUND LIGHTS

Two (2) LED ground lights shall be installed under rear step of the apparatus.

The ground lights shall automatically activate when the parking brake is applied.

REAR TAILBOARD LIGHTS

Two (2) incandescent step lights with clear lens shall be installed to illuminate the step surface(s) at rear of the apparatus body.

The step/walkway light switch shall be installed and wired to the parking brake.

DECK LIGHTS - REAR

The deck lights shall be installed at the rear of the hose bed.

One (1) Unity Model #AG spotlight and one (1) Unity Model #AG floodlight, with 35 watt bulbs shall be installed. The lights shall have an "on-off" switch.

SCENE LIGHT

Six (6) Whelen Series 900 Super LED 7-1/8" x 9-1/8" scene light shall be installed.

The scene lights shall be provided with a straight standoff bezel.

SCENE LIGHT LOCATIONS

One (1) scene light shall be located on the left side of the cab.

One (1) scene light shall be located on the right side of the cab.

One (1) scene light shall be located on the left side of the apparatus body.

Bidder Complies	
Yes	No

One (1) scene light shall be located on the right side of the apparatus body.

Two (2) scene lights shall be located on the rear of the apparatus body.

SCENE LIGHT SWITCHING

One (1) scene light switch with indicator shall be installed on the cab main switch panel to control the left side scene light(s). The switch shall be labeled "LEFT SCENE".

One (1) scene light switch with indicator shall be installed on the cab main switch panel to control the right side scene light(s). The switch shall be labeled "RIGHT SCENE".

One (1) scene light switch with indicator shall be installed on the cab main switch panel to control the rear scene light(s). The switch shall be labeled "REAR SCENE".

The rear scene lights shall activate automatically upon placing the transmission into reverse.

TRAFFIC ARROW LIGHT

One (1) Whelen Model #TAL85 Traffic Advisor shall be installed. The light shall be equipped with eight (8) LED lights measuring 46" in length. The unit shall be mounted at the rear of the apparatus body. The Traffic Advisor control head shall be mounted inside the cab and be accessible by the driver and officer.

The traffic arrow light shall be recessed mounted at the rear of the apparatus body.

Bidder Complies	
Yes	No

APPARATUS CHASSIS MODIFICATIONS SPECIFICATIONS

FLUID DATA PLAQUE

One (1) fluid data plaque containing required information shall be provided based on the applicable components for this apparatus, compliant with NFPA Standards:

- Engine oil
- Engine coolant
- Chassis transmission fluid
- Drive axle lubricant
- Power steering fluid
- Pump transmission lubrication fluid
- Other NFPA applicable fluid levels or data as required

Location shall be in the driver's compartment or on driver's door.

DATA & WARNING LABELS

HEIGHT LENGTH & WEIGHT

A highly visible label indicating the overall height, length, and weight of the vehicle shall be installed in the cab dash area.

CAB SEATING POSITION LIMITS

The label shall also include the seating positions for firefighters. A weight allowance of 250 pounds for each shall be factored into the gross vehicle weight rating of the chassis.

NO RIDE LABEL

One (1) "NO RIDERS" label shall be applied on the vehicle at the rear step area or other applicable areas. The label shall warn personnel that riding in or on these areas, while the vehicle is in motion is prohibited.

CAB SEATING POSITION LIMITS

One (1) label shall be installed in the cab to indicate seating positions for firefighters. A weight allowance of 250 pounds for each shall be factored into the gross vehicle weight rating of the chassis.

HELMET WARNING TAG

One (1) label shall be installed in the cab, visible from each seating position. The label shall read "CAUTION: DO NOT WEAR HELMET WHILE SEATED." Helmets must be properly stowed while the vehicle is in motion according to the current edition of NFPA 1901.

Bidder Complies	
Yes	No

REAR TOWING PROVISIONS

There shall be two tow eyes furnished under the rear of the body and attached directly to each chassis frame rail. There shall be a reinforcement spreader bar connecting the two tow eyes. Tow eyes are to be constructed of 3/8" plate steel with a 4" I.D. hole, large enough for passing through a tow chain end hook.

The tow plates shall be painted black.

BUMPER

The chassis shall feature a standard, two (2) rib wrap around style bumper which is 12" high.

The bumper shall be constructed from highly polished, 10 gauge, 316 stainless steel and shall wrap the width of the cab.

The bumper shall be 102” wide and shall be mounted to the frame rails through zinc coated fasteners.

BUMPER EXTENSION

The chassis frame shall be extended 6" with reinforced steel angle and structural channel by the body builder. The extension shall be designed to support the bumper and other equipment to be installed.

FRONT BUMPER GRAVELSHIELD

A 6" front to rear filler panel constructed from NFPA compliant, slip resistant aluminum tread plate shall be provided on the front chassis frame extension. The extension shall be covered on the top and sides, up to the level of front bumper and shall be reinforced to support one (1) firefighter (approximately 250 pounds) and the equipment specified to be installed.

TOW EYES

Two (2) 3" tow eyes shall be mounted to the bumper extension through the front face of the bumper. The tow eyes shall be heavy polished nickel plated steel which shall not chip when used with chains and hooks.

HUB AND LUG NUT COVERS

The apparatus shall have chrome or stainless steel hub and lug nut covers on the front and single rear axles.

TIRE PRESSURE INDICATOR

There shall be a tire pressure indicator at each tire’s valve stem on the vehicle that shall indicate if there is insufficient pressure in the specific tire.

"U" shaped returns shall be provided so as all indicators are visible per NFPA.

Bidder Complies	
Yes	No

EXHAUST SYSTEM

The chassis exhaust shall be modified and redirected to the right side of the apparatus and will exit ahead of the rear wheel.

The exhaust shall terminate in 4" diameter pipe and shall be compatible with a Superior Systems exhaust extrication system.

EXHAUST HEAT SHIELD

A heat shield shall be installed under the body in the areas where the exhaust system is routed.

REAR MUD FLAPS

One (1) pair of black mud flaps shall be installed behind the rear wheels.

ON-SPOT TIRE CHAINS

"On-Spot" automatic tire chains shall be installed on the rear axle of the apparatus. A switch installed on the cab dash shall allow the operator to "Engage" and "Disengage" the tire chains without stopping to enhance traction and braking while in forward or reverse motion. The system shall include protective switch guard, continuous duty solenoid, arm bearings and replaceable chain plates.

AIR TANK DRAIN EXTENSION

Three (3) cables from the spring loaded air tank drain shall be routed and attached to the outer edge of the apparatus for ease of access. The 1/8" braided steel cable shall allow accumulated moisture in the air brake system to be easily drained. The cable shall be installed so that maximum ground clearance is maintained.

Bidder Complies	
Yes	No

APPARATUS PUMP AND PLUMBING SPECIFICATIONS

WATEROUS CSUC20 SINGLE STAGE PUMP

A Waterous model CSUC20, single stage centrifugal pump shall be designed to mount on the chassis frame rails and shall be split-drive shaft driven. The pump casing shall be of high-tensile, close-grained gray iron. Pump body shall be horizontally split in two (2) sections, for easy removal of impeller assembly including wear rings and bearings from beneath the pump without disturbing the mounting or piping.

Impeller

A matched bronze impeller specifically designed for the fire service will be provided. It will be accurately balanced both mechanically and hydraulically, for vibration-free operation. The impeller shaft shall be stainless steel, heat-treated and precisely ground to size. It shall be supported on both ends by oil or grease lubricated ball bearings.

Replaceable wear rings, bronze, reverse-flow, labyrinth-type shall be provided. Three (3) deep groove ball bearings shall be located outside the pump to give rugged support and proper alignment to the impeller shaft. The bearings shall be oil or grease lubricated. All bearings shall be completely separated from the water being pumped.

Pump Transmission

The housing shall be constructed of high tensile aluminum and be of three (3) piece, horizontally split design. The transmission driveline shafts shall be made from alloy steel forging, hardened and ground to size. The drive and driven sprockets shall be made of steel and shall be carbonized and hardened. The drive chain shall be Morse HV involute form chain. The lubrication system shall be an impeller shaft driven oil pump to deliver oil to an integral spray header, to completely pressure lubricate the drive chain.

Pump Mounting

The pump shall be bolted to steel angles in pump module, using grade 8 bolts.

Drive Line

Hollow-tube drivelines and universals shall be properly matched to the engine and transmission output torque ratings.

1500 GPM FIRE PUMP SPECIFICATIONS

The centrifugal type fire pump shall be a Waterous model CSUC20 midship mounted with a rated capacity of 1500 GPM. The pump shall meet NFPA 1901 requirements.

The pump shall be certified to meet the following deliveries:

1500 GPM @ 150 PSI
1500 GPM @ 165 PSI

Bidder Complies	
Yes	No

1050 GPM @ 200 PSI
750 GPM @ 250 PSI

LEFT SIDE -- 6" UNGATED INTAKE

One (1) 6" ungated suction intake shall be installed on the left side pump panel to supply the fire pump from an external water supply. The threads shall be 6" NST. The intake shall be provided with a removable screen.

One (1) 6" chrome plated cap shall be provided. The threads shall be NST and the cap shall be equipped long handles.

RIGHT SIDE -- 6" UNGATED INTAKE

One (1) 6" ungated suction intake shall be installed on the right side pump panel to supply the fire pump from an external water supply. The intake shall be provided with a removable screen.

One (1) 6" chrome plated cap shall be provided. The threads shall be NST and the cap shall be equipped long handles.

FIRE PUMP MECHANICAL SHAFT SEAL

The Waterous fire pump shall be equipped with self-adjusting, maintenance free, 'mechanical shaft seal' which is designed to be functional in the unlikely event of a seal failure.

IMPELLER HUBS

The Waterous fire pump impeller hubs shall be "Flame Plated", impregnated with tungsten carbide to assure maximum pump life and efficiency despite the presence of abrasive particles, such as fine sand, in the water being pumped.

FIRE PUMP ANODE SYSTEM

The Waterous fire pump plumbing system shall be provided with an anode system to reduce corrosion within the piping. The anode system shall consist of replaceable zinc intake screens installed in the suction barrels and bolt-in or screw-in type replaceable anodes that are easily replaced. These items are designed to sacrifice the zinc element to galvanic corrosion. Without this protection, galvanic corrosion may damage the iron pump body and fittings.

ELECTRIC/PNEUMATIC PUMP SHIFT

The fire pump shift shall be air-operated incorporating an air cylinder with an electrically actuated pneumatic switch to shift from ROAD to PUMP and back. The fire pump shift control switch and valve shall be mounted in the cab.

The fire pump shift system shall be equipped with a means to prevent unintentional movement of the control device from its set position. The system shall include a nameplate indicating the chassis transmission shift selector position to be used for pumping and located so that it can be easily read from the driver's position.

Bidder Complies	
Yes	No

The system shall include the applicable NFPA standard interlocks, pump shift and OK TO PUMP indicator lights in the cab and pump panel. The fire pump shift system shall be equipped with an interlock system to ensure that the pump drive system components are properly engaged in the pumping mode of operation so the pumping system can be safely operated from the pump operator's position.

If applicable, the secondary braking device shall be automatically disengaged for pumping operations.

MANUAL OVERRIDE FIRE PUMP SHIFT

The Waterous fire pump shall be equipped with a manual pull type shift on the pump panel location, with will be in addition to the air operated pump shift system.

FIRE PUMP PRIMING SYSTEM

A Waterous model number VPO electrically driven, positive displacement, rotary vane type 'oil less' priming pump shall be installed. The system shall be activated with a push button type control.

The pump shall be capable of taking suction and discharging water with a lift of 10 feet in not more than 30 seconds with the pump dry, through 20 feet of suction hose of appropriate size. The priming system shall comply with applicable sections of the NFPA standards.

PRESSURE GOVERNOR AND ENGINE-PUMP MONITORING

One (1) Fire Research InControl series TGA300 pressure governor and monitoring display kit shall be installed. The kit shall include a control module, intake pressure sensor, discharge pressure sensor, and cables. The control module case shall be waterproof and have dimensions not to exceed 5 1/2" high by 10 1/2" wide by 2" deep. Inputs for monitored information shall be from a J1939 data bus or independent sensors. Outputs for engine control shall be on the J1939 data bus or engine specific wiring.

The following continuous displays shall be provided:

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

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

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

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

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

Inputs to the control panel from the pump discharge and intake pressure sensors shall be electrical. The discharge pressure display shall show pressures from 0 to 600 psi. The intake pressure display shall show pressures from -30 in. Hg to 600 psi.

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

The pressure governor, monitoring and master pressure display shall be programmed to interface with a specific engine.

PUMP ANODES

There shall be sacrificial, zinc anodes in the pump steamer ports which shall protect the pump and piping from electrolysis. These anodes shall also act as screens.

PUMP PLUMBING SYSTEM

The fire pump plumbing system shall be of rigid stainless steel pipe or flexible piping with stainless steel fittings. Mechanical grooved couplings shall be installed to permit flexing of the plumbing system and allow for quick removal of piping or valves for service. Flexible hose couplings shall be threaded stainless steel or mechanical grooved coupling connections.

The fire pump and plumbing shall be hydrostatically tested in compliance to applicable sections of NFPA standards. The test results shall be included in the delivery documentation.

Bidder Complies	
Yes	No

FIRE PUMP MASTER DRAIN

The fire pump plumbing system and fire pump shall be piped to a single pump panel mounted 'hand wheel' type master pump drain assembly. The master drain valve shall be a bronze master drain with a rubber disc seal, a universal joint and a hand wheel control on the pump panel. The master drain shall also provide for low point drainage of the fire pump and auxiliary devices.

ADDITIONAL LOW POINT DRAINS

The plumbing system shall be equipped with additional low point manually operated drain valves to allow total draining of the fire pump plumbing system. These valves shall be accessible from the side of the vehicle and labeled for exact location.

FIRE PUMP PAINTING

The fire pump shall be painted by the fire pump manufacturer.

HOSE THREADS

The hose threads shall be National Standard Thread (NST) on all base threads on the apparatus intakes and discharges.

WATER TANK TO PUMP LINE

One (1) 3-1/2" water tank to fire pump line shall be provided with a full flow quarter turn ball Waterous valve, 3" piping, and with flex hose and stainless steel hose clamps. The tank to pump line shall be equipped with a check valve to prevent pressurization of the water tank.

The line shall be flow tested during the fire pump testing and shall meet applicable requirements of NFPA standards.

The specified valve shall be equipped with one (1) manually operated, swing-type control at the top mount pump panel console. The control handle shall be equipped with a quarter-turn locking feature. The valve shall be equipped with a color-coded name plate.

FIRE PUMP TO WATER TANK FILL LINE

One (1) 2" fire pump to water tank refill and pump bypass cooler line shall be provided. The valve shall be a full flow quarter turn ball valve with 2" piping and flex hose to tank. The valve control handle shall have a nameplate located near the valve control.

The specified valve shall be an Akron 8000 Series two-inch (2") valve with a stainless ball.

One (1) Akron valve with a Class 1 manually operated, swing-type and control at the top mount pump panel console shall be provided on the specified intake. The up and down movement control handle shall be equipped with a quarter-turn locking feature. The valve shall be equipped with a color-coded name plate.

Bidder Complies	
Yes	No

COMPRESSED AIR FOAM SYSTEM

One (1) Pnuemax MAXCAFS 200 PTO compressed air foam system shall be designed and installed to provide compressed air foam from the specified discharges.

Air Compressor System

The compressor shall be driven by the chassis engine, utilizing a "Hot Shift" transmission PTO. The air compressor shall be an oil flooded rotary screw type, with the system designed to supply a minimum of 200 SCFM of free air at maximum CAFS operating RPM. The compressor shall incorporate an integral gear box with oil lubricated helical gears. The gear ratio shall be approximately 3:1 over the input shaft speed. The air compressor drive system shall be designed to operate the air end at maximum RPM when the water pump is developing 130 to 140 PSI in a "no flow" state. The completed compressor system shall be capable of maintaining prolonged pressures from 100 to 175 lbs. per square inch throughout its service life.

The compressor shall be controlled by a pneumatic modulating inlet valve mounted on the air end inlet. This control shall sense air pressure and control the air delivery of the air end while maintaining constant pressure. An Auto Sync balancing system shall be provided to maintain the air pressure within plus or minus 5% of the water pump pressure, throughout the pressure range. Auto Sync controls shall be installed on the pump operator's panel with the following modes:

- AUTOMATIC: Air pressure matched to water pump pressure.
- FIXED: Air pressure defaults to manual setting on compressor mounted control valve.
- UNLOADED: Air pressure reduced to 40 PSI for standby operations.

All oil and control air shall be routed in wire braided hose conforming to SAE 100R1 standards for hydraulic hose. The compressor system sump/pressure vessel shall be constructed entirely of stainless steel and in compliance with the requirements of the ASME Boiler and Pressure Vessel Code. The sump/pressure vessel shall be equipped with an oil level sight glass, drain valve, air pressure relief valve and 1.5" threaded brass oil fill cap.

The air compressor system shall feature a spin-on, full flow oil filter unit and a thermostatic valve to control oil flow to the cooler. This thermostat shall maintain the system oil temperature within 160 to 225 degrees Fahrenheit range.

A modular air/oil separator unit with spin-on element shall be provided and installed in close proximity to the sump. Replacement elements for the oil filter and separator shall be readily available.
The compressor shall be cooled by the apparatus fire pump, utilizing an all copper and brass shell and tube heat exchanger. Water will flow through the heat exchanger whenever the fire pump is operating. An in-line strainer shall be installed on the water inlet side of the heat exchanger to prevent clogging. The strainer shall be removable for cleaning. The compressor cooling system shall be capable of maintaining recommended operating temperatures throughout its full operating range at ambient temperatures up to 115 degrees Fahrenheit. A "fail safe" switch shall be provided to preclude engagement of the compressor PTO unless the fire pump is engaged.

Bidder Complies	
Yes	No

Plumbing

A foam manifold with minimum 600 GPM flow capacity and an integral paddlewheel flow sensor shall be installed by the apparatus manufacture to distribute foam solution to the designated foam discharges. A check valve is provided at the inlet end of the foam manifold to prevent foam solution back-flow into the pump. All added foam discharge piping shall be stainless steel or high pressure wire braided reinforced hose with stainless steel fittings.

Each compressed air foam discharge shall be equipped with individual corrosion resistant check valves on both the water and compressed air plumbing that prevent back-flow of foam solution, air and/or compressed air foam into the pump, air lines or foam proportioning system.

All components of the piping system exposed to pressurized air from the CAFS shall be designed for at least 500 PSIG burst pressure.

Instruments and Controls

The Compressed Air Foam System (CAFS) shall be controlled by a color display logic controller. This display shall be rugged in design for harsh weather and also suitable for mobile applications. The display must be weather resistant from the front and back sides and utilize a single M12 electrical connector for ease of installation and clutter free wiring.

The size of the color display shall be such that it minimizes required pump panel space while still allowing the user safe and effective CAFS operation. The color display shall incorporate LED back lighting for long lasting performance at minimum power consumption.

The operation of the CAFS control system shall be simple one button touch to turn the system “ON” or “OFF”. No other operator input is required. There will be several systems monitored to ensure safe continuous operation to include:

- Display of CAFS air pressure from 0 to 200 PSI. This display can also be changed to kPa or BAR display according to customer needs.
- Display CAFS oil temperature from 100 to 300 degrees F. Temperature reading can also be displayed in Celsius.
- Display of PTO driveline RPM’s while also providing an audible and visual warning when approaching unsafe levels.
- Display two separate compressor hour meters. One as a true hour meter and a second that can be reset to each incident.
- Display will automatically adjust contrast for a more comfortable view in low light and night time operations.

- There shall also be an onboard diagnostic screen to quickly and accurately diagnose problems with senders, switches or other systems to minimize downtime.

System Tests

Prior to delivery, the completed apparatus shall pass the following tests which shall be performed by the apparatus manufacturer:

The apparatus manufacturer shall test the operation of the water pump and air compressor system simultaneously to determine the integrity of the system and to ensure that there is adequate power available to operate these components as a complete compressed air foam system. The compressed air source shall be operated to flow 200 SCFM at a minimum of 125 PSIG and the water pump shall discharge 400 GPM at 125 PSI net pump pressure through separate discharge outlets for a period of one (1) hour. Readings of the airflow rate and pressure, and the water pump pressure and discharge rate shall be taken and recorded at least every ten (10) minutes.

A standby run test shall be performed in which the CAFS is operated to discharge finished foam through 200 feet of 1 1/2" hose at 125 PSI. With the apparatus booster tank at 1/2 full, the valve at the end of the hose shall be closed no faster than in 3 seconds and no slower than 10 seconds, and the engine speed maintained for 10 minutes without discharging water, air or foam solution. At the end of 10 minutes, the valve shall be reopened no faster than in 3 seconds and no slower than in 10 seconds. Any damage to the system that affects its rated performance characteristics or the lack of a fire stream immediately upon opening the hose line valve shall constitute failure of this test.

Manuals

Two (2) complete operation and maintenance manuals shall be provided with the completed apparatus. Manuals shall include instruction in the operation and maintenance of the overall compressed air foam system and each major component.

FOAM PRO FOAM SYSTEM

One (1) FoamPro part number S105-2001 electronic foam proportioning system shall be provided. The system shall be capable of using both Class A and most Class B foam concentrates. The foam proportioning operation shall be designed for direct measurement of water flows, and shall remain consistent within the specified flows and pressures. The system shall be capable of accurately delivering foam solution as required by applicable sections of the NFPA standards.

The system shall be equipped with a digital electronic control display suitable for installation on the pump panel. There shall be a microprocessor incorporated within the electronic controls that shall receive input from the system's flowmeter, while also monitoring the foam concentrate pump output. The microprocessor shall compare the values to ensure that the desired amount of foam concentrate is injected onto the discharge side of the fire pump.

Paddlewheel-type flowmeter(s) shall be installed in the discharges specified to be "foam capable". When the use of more than one (1) flowmeter is required, an electronic interface module will be provided to total these flows and send the flow total to the microprocessor in the computer control module.

Bidder Complies	
Yes	No

The digital computer control display shall enable the pump operator to perform the following control and operation functions for the foam proportioning system:

- Provide push-button control of foam proportioning rates from 0.1% to 3%, in 0.1% increments
- Show current flow-per-minute of water
- Show total volume of water discharged during and after foam operations are completed
- Show total amount of foam concentrate consumed
- Simulate flow rates for manual operation
- Perform setup and diagnostic functions for the computer control microprocessor
- Flash a "low concentrate" warning when the foam concentrate tank (s) become low
- Flash a "no concentrate" warning and shut the foam concentrate pump off, preventing damage to the pump, should the foam tank(s) become empty

A 12 volt electric motor driven positive displacement foam concentrate pump shall be provided and installed in an accessible location. The pump capacity range shall be 0.1 to 2.6 GPM (9.5L/min) at 150 PSI with a maximum operating pressure up to 400 PSI (27.6 BAR). The system shall draw a maximum of 40 amps at 12 volts. An electronic driver for the pump motor shall be mounted to the base of the pump and shall receive signals from the computer control display, and regulate the 1/2 horsepower (.40 Kw) electric motor directly coupled to the concentrate pump in a variable speed duty cycle to ensure that the correct proportion of concentrate, preset by the pump operator is injected into the water stream.

A full flow check valve shall be provided to prevent foam contamination of the fire pump and water tank or water contamination of the foam tank.

Components of the complete proportioning system as described above shall include:

- Operator control and display
- Paddlewheel flowmeter(s)
- Pump and electric motor/motor driver
- Wiring harnesses
- Low level tank switch
- Foam injection check valve
- Main waterway check valve

The foam system shall be installed and calibrated to manufacturer's requirements. In addition the system shall be tested and certified by the apparatus manufacturer to meet applicable NFPA standards.

The foam system design shall be tested and pass environmental testing in accordance to SAE standards. The system shall be third party tested to certify compliance with RFI/EMI emissions per MIL-STD-416E.

An installation and operation manual shall be provided for the unit. The system shall have a one (1) year limited warranty by the foam system manufacturer.

Bidder Complies	
Yes	No

CONTROL CONNECTION CABLE FOAM SYSTEM

The FoamPro 2001 Series foam system shall be provided with a twelve (12) foot control cable from the controller to the foam pump assembly.

PUMP PANEL CONTROL FOAM SYSTEM

The FoamPro 2001 Series foam system shall be provided with pump panel mounted control assembly.

INSTRUCTION AND RATING LABEL -- FOAM SYSTEM

A FoamPro part number 6032-0020 instruction and system rating label shall be provided. The label shall display information for a FoamPro 2001 Series foam system and shall meet applicable sections of the NFPA standards.

SCHEMATIC LABEL -- FOAM SYSTEM

A FoamPro foam system schematic label shall be installed on the pump panel near foam controls. The label shall be a diagram of the FoamPro 2001 foam system layout and shall meet applicable sections of the NFPA standards.

1" FOAM TANK CONTROL -- CLASS A

One (1) Class A foam tank shall be plumbed with 1" valve and corrosion resistant hose from the foam tank to the foam inlet of the foam system. The manually opened valve shall be provided behind the pump panel with a label.

FOAM LINE STRAINER

One (1) bronze strainer with 304 stainless steel #20 mesh screen shall be installed in the foam line ahead of the foam concentrate pump. The strainer shall be easily accessible and removable for cleaning. The strainer screen shall be suitable for all types of Class A and B foam concentrates.

INTEGRAL CLASS A FOAM TANK -- 30 GALLON

One (1) thirty (30) gallon Class A foam tank shall be installed within the water tank. The non-corrosive foam tank shall meet applicable sections of NFPA standards. The foam concentrate tank shall be provided with sufficient wash partitions so that the maximum dimension perpendicular to the plane of any partition shall not exceed 36 inches. The swash partition(s) shall extend from wall to wall and cover at least 75 percent of the area of the plane of the partition.

The foam concentrate tank shall be provided with a fill tower or expansion compartment having a minimum area of 12 square inches and having a volume of not less than 2 percent of the total tank volume. The fill tower opening shall be protected by a completely sealed air-tight cover. The cover shall be attached to the fill tower by mechanical means. The fill opening shall be designed to incorporate a 1/4 inch removable screen and shall be located so that foam concentrate from a five (5) gallon container can be dumped directly to the bottom of the tank to minimize aeration without the use of funnels or other special devices.

The foam tank fill tower shall be equipped with a pressure/vacuum vent that enables the tank to

compensate for changes in pressure or vacuum when filling or withdrawing foam concentrate from the tank. The pressure/vacuum vent shall not allow atmospheric air to enter the foam tank except during operation or to compensate for thermal fluctuations. The vent shall be protected to prevent foam concentrate from escaping or directly contacting the vent at any time. The vent shall be of sufficient size to prevent tank damage during filling or foam withdrawal.

A color coded label or visible permanent marking that reads "FOAM TANK FILL" shall be placed at or near any foam concentrate tank fills opening. A label shall be placed at or near any foam concentrate tank fill opening that specifies the type of foam concentrate the system is designed to use. Any restrictions on the types of foam concentrate that can be used with the system shall also be stated, and a warning message that reads "WARNING: DO NOT MIX BRANDS AND TYPES OF FOAM."

The foam concentrate tank outlet connection shall be designed and located to prevent aeration of the foam concentrate and shall allow withdrawal of 80 percent of the foam concentrate tank storage capacity under all operating conditions with the vehicle level.

The foam tank(s) shall be fabricated by United Plastic Fabricating.

FOAM TANK DRAIN -- UNDER TANK

The foam tank shall have one (1) 1" gate valve drain provision installed.

CLASS A FOAM TANK GAUGE

One (1) Fire Research TankVision model WLA260-A00 foam tank indicator kit shall be installed at the operator's panel. The kit shall include an electronic indicator module, a pressure sensor, a 10-ft sensor cable and a tank vent. The indicator shall show the volume of Class A foam concentrate in the tank on nine (9) easy to see super bright LEDs. A wide view lens over the LEDs shall provide for a viewing angle of 180 degrees. The indicator case shall be waterproof, manufactured of aluminum, and have a distinctive green label.

The program features shall be accessed from the front of the indicator module. The program shall support self-diagnostics capabilities, self-calibration, and a data link to connect remote indicators. Low foam warnings shall include flashing LEDs at 1/4 tank, down chasing LEDs when the tank is almost empty, and an output for an audio alarm.

The indicator shall receive an input signal from an electronic pressure sensor. The sensor shall be mounted from the outside of the foam tank near the bottom. No probe shall be placed on the interior of the tank. The foam tank vent shall be installed on the foam fill tower. Wiring shall be weather resistant and have automotive type plug-in connectors.

FOAM SYSTEM DISCHARGE

Two (2) 2" discharges and locations shall be either water or CAFS foam discharges. The CAFS air valve shall be a ½" diameter, manually controlled ball valve suitable for the application.

The CAFS capable discharges shall be both speedlays.

Bidder Complies	
Yes	No

FOAM SYSTEM DISCHARGE

Two (2) 2-1/2" discharges and locations shall be either water or CAFS foam discharges. The CAFS air valve shall be a ¾" diameter, manually controlled ball valve suitable for the application.

The CAFS capable discharges shall be a 2-1/2" discharge on each pump panel.

FIRE PUMP SPLIT SHAFT DRIVESHAFTS AND INSTALLATION

The mid-ship split shaft fire pump shall be installed and shall include installation of the fire pump, modification and/or fabrication of new drivelines and all pump-mounting brackets. The drive shaft(s) shall be spin balanced prior to final installation.

INTAKE RELIEF/DUMP VALVE

One (1) TFT A18 series, 2-1/2" intake relief/dump valve preset at 125 psi shall be permanently installed on the suction side of the fire pump. The valve shall have an adjustment range of 75 psi to 250 psi, and shall be designed to automatically self-restore to a non-relieving position when excessive pressure is no longer present.

Discharge side of the intake relief valve shall be plumbed away from the pump operator.

FIRE PUMP COOLING

The fire pump shall be equipped with 3/8" cooling line from the pump to the water tank. This re-circulation line shall be controlled by a pump panel control valve with nameplate label noting it as the "fire pump bypass cooler". There shall be a check valve installed in the pump cooler line to prevent tank water from back flowing into the pump when it is not in use.

OVERHEAT PROTECTION MANAGER

The Waterous fire pump shall be equipped with an overheat protection manager which monitors the temperature of the water inside the pump and relieves water when the temperature inside the pump exceeds 140 degrees Fahrenheit.

The Waterous Model #OPM shall also have an warning light on the pump panel to provide additional protection in the event the temperature inside the pump continues to rise with the overheat protection valve open. The warning light and test button shall be mounted to a heavy polished casting that is mounted to the pump operator's panel.

CHASSIS ENGINE HEAT EXCHANGER COOLING SYSTEM

The apparatus shall be equipped with a heat exchanger for supplementary chassis engine cooling during fire pump operations. A manually opened valve, mounted at the operator's panel, shall direct water from the fire pump to the heat exchanger that is mounted in the engine radiator cooling hose. The system shall provide cooling water from the fire pump to circulate around the engine radiator coolant without mixing or coming in direct contact with the engine coolant. The unit shall be installed by the chassis manufacturer and connected to the plumbing system by the fire apparatus manufacturer.

Bidder Complies	
Yes	No

A nameplate label shall be installed on the pump panel noting "engine cooling system" with "on-off" opening directions noted.

UNDERWRITERS LABORATORIES FIRE PUMP TEST

The pump shall undergo an Underwriters Laboratories Incorporated test per applicable sections of NFPA standards, prior to delivery of the completed apparatus.

The UL acceptance certificate shall be furnished with the apparatus on delivery.

FIRE PUMP TEST LABEL

A fire pump performance and rating label shall be installed on the fire apparatus pump panel. The label shall denote levels of pump performance and testing completed at factory. These shall include GPM at net pump pressure, RPM at such level, and other pertinent data as required by applicable NFPA standards. In addition, the pressure control device, tank to pump flow tests, and other required testing shall be completed.

In addition, the entire pump, suction and discharge passages shall be hydrostatically tested to a pressure as required by applicable NFPA standards. The pump shall be fully tested at the pump manufacturer's factory to the performance specifications as outlined by applicable NFPA standards. Pump shall be free from objectionable pulsation and vibration.

If applicable, the fire pump shall be tested and rated as follows:

100% of rated capacity at 150 pounds net pressure.
70% of rated capacity at 200 pounds net pressure.
50% of rated capacity at 250 pounds net pressure.
100% or rated capacity at 165 pounds net pressure.

HIGH ALTITUDE FIRE PUMP TEST

The pump shall be capable of flowing full pump rating at a higher than standard altitude. The altitude for the delivered apparatus shall be 5000 feet above sea level.

The fire pump shall be rated and tested to perform at 5000' ASL.

LEFT SIDE -- 2-1/2" GATED INTAKE

One (1) 2-1/2" gated suction intake shall be installed on left side pump panel to supply the fire pump from an external water supply. The control valve shall be a quarter turn ball valve and shall have 2-1/2" NST female thread of chrome plated brass.

The intake shall be equipped with a ¾" drain and bleeder valve. A nameplate label and removable screen shall be installed.

An Innovative Controls ¾" cast bronze quarter-turn drain/bleeder valve shall be installed. The valve shall be complete with a chrome plated bronze ball, reinforced teflon seals, and blow-out proof stem rated to 600 PSI. A chrome plated zinc handle shall be provided on each drain valve complete with a recessed ID label provision. The handle shall lift to open and push down to close. The valve shall be mounted with an insulating gasket between the valve and the panel to reduce freezing potential.

One (1) 2-1/2" chrome plated plug shall be provided. The threads shall be NST and the plug shall be equipped rocker lugs and chain or cable securement.

The specified valve shall be an Akron 8000 Series two and one half-inch (2-1/2") valve with a stainless ball.

The specified valve shall be equipped with one (1) manually operated, swing-type manual control located adjacent the intake. The valve shall be equipped with a color-coded name plate.

RIGHT SIDE -- 2-1/2" GATED INTAKE

One (1) 2-1/2" gated suction intake shall be installed on right side pump panel to supply the fire pump from an external water supply. The control valve shall be a quarter turn ball valve and shall have 2-1/2" NST female thread of chrome plated brass.

The intake shall be equipped with a ¾" drain and bleeder valve. A nameplate and removable screen shall be installed.

An Innovative Controls ¾" cast bronze quarter-turn drain/bleeder valve shall be installed. The valve shall be complete with a chrome plated bronze ball, reinforced teflon seals, and blow-out proof stem rated to 600 PSI. A chrome plated zinc handle shall be provided on each drain valve complete with a recessed ID label provision. The handle shall lift to open and push down to close. The valve shall be mounted with an insulating gasket between the valve and the panel to reduce freezing potential.

One (1) 2-1/2" chrome plated plug shall be provided. The threads shall be NST and the plug shall be equipped rocker lugs and chain or cable securement.

The specified valve shall be an Akron 8000 Series two and one half-inch (2-1/2") valve with a stainless ball.

The specified valve shall be equipped with one (1) manually operated, swing-type manual control located adjacent the intake. The valve shall be equipped with a color-coded name plate.

TWO (2) 1-1/2" SPEEDLAY DISCHARGES

Two (2) 1-3/4" pre-connect hose speedlays shall be installed ahead of the front of body or pump enclosure, controlled with quarter turn 2" diameter ball valves. The outlets shall be equipped 2" NPT female swivel x 1-1/2" male NST hose threads.

The hosebed decking shall be constructed with slots integrated into the hosebed floor.

The hose bed shall provide a minimum capacity of 200 feet of 1-3/4" diameter double jacket hose with hose and nozzle provided by fire department.

An Innovative Controls ¾" cast bronze quarter-turn drain/bleeder valve shall be installed. The valve shall be complete with a chrome plated bronze ball, reinforced Teflon seals, and blow-out proof stem rated to 600 PSI. A chrome plated zinc handle shall be provided on each drain valve complete with a recessed ID label provision. The handle shall lift to open and push down to close. The valve shall be mounted with an insulating gasket between the valve and the panel to reduce freezing potential.

The specified valves shall be an Akron 8000 Series two-inch (2") valve with a stainless ball.

Two (2) manually operated swing type valves with Innovative Controls control at the top mount pump panel console shall be installed on the specified discharge. The up and down movement control handles shall be equipped with a squeeze-and-release locking feature. The valves shall be equipped with a color coded name plate.

Two (2) 2-1/2" Noshok discharge pressure gauges (30"-0-400 PSI) shall be provided. The face of the gauge shall be a WHITE dial with black letters. The gauges will be located on the pump instrument panel.

VINYL SPEEDLAY END COVERS

The speedlay hosebeds shall be equipped with a vinyl cover with end flaps and shall be secured with a hook and loop fastening system.

The color of the vinyl shall be determined at the pre-construction conference.

ROLLERS FOR PRE-CONNECTED SPEEDLAY HOSE BED

The pre-connect speedlay hosebed shall be equipped stainless steel "U" shaped roller system, one on each end of the hosebed.

REMOVABLE TRAY FOR PRE-CONNECTED HOSE BEDS

The 1-3/4" pre-connect hosebed(s) shall be equipped with a "U" shaped aluminum hose tray. The unit shall be equipped with pull out hand holes and retaining devices to secure the tray, nozzle, and hose in transit.

LEFT SIDE PUMP PANEL -- 2-1/2" DISCHARGES

Two (2) 2-1/2" discharges shall be installed on the left side pump panel area and shall be controlled by quarter turn ball valves. The discharges shall have 2-1/2" NST male hose threads. A color coded nameplate label shall be provided adjacent the control handles.

Innovative Controls ¾" cast bronze quarter-turn drain/bleeder valves shall be installed. The valves shall be complete with a chrome plated bronze ball, reinforced Teflon seals, and blow-out proof stem rated to 600 PSI. A chrome plated zinc handle shall be provided on each drain valve complete with a recessed ID label provision. The handles shall lift to open and push down to close. The valves shall be mounted with an insulating gasket between the valves and the panel to reduce freezing potential.

Two (2) chrome plated elbows with rocker lugs shall be provided with 2-1/2" NST swivel female x 2-

1/2" NST male hose threads.

Two (2) 2-1/2" NST rocker lug chrome plated vented caps and cable or chain securement shall be provided.

The specified valves shall be an Akron 8000 Series two and one half-inch (2-1/2") valve with a stainless balls.

Two (2) manually operated swing type valves with Innovative Controls control at the top mount pump panel console shall be installed on the specified discharges. The up and down movement control handles shall be equipped with a squeeze-and-release locking feature. The valves shall be equipped with a color coded name plate.

Two (2) 2-1/2" Noshok discharge pressure gauges (30"-0-400 PSI) shall be provided. The face of the gauge shall be a WHITE dial with black letters. The gauges will be located on the pump instrument panel.

RIGHT SIDE PUMP PANEL -- 2-1/2" DISCHARGES

Two (2) 2-1/2" discharges shall be installed on the right side pump panel area and shall be controlled by quarter turn ball valves. The discharge shall have 2-1/2" NST male hose threads. A color coded nameplate label shall be provided adjacent the control handles.

Innovative Controls ¾" cast bronze quarter-turn drain/bleeder valves shall be installed. The valves shall be complete with a chrome plated bronze ball, reinforced Teflon seals, and blow-out proof stem rated to 600 PSI. A chrome plated zinc handle shall be provided on each drain valve complete with a recessed ID label provision. The handles shall lift to open and push down to close. The valves shall be mounted with an insulating gasket between the valves and the panel to reduce freezing potential.

Two (2) chrome plated elbows with rocker lugs shall be provided with 2-1/2" NST swivel female x 2-1/2" NST male hose threads.

Two (2) 2-1/2" NST rocker lug chrome plated vented caps and cable or chain securement shall be provided.
The specified valves shall be an Akron 8000 Series two and one half-inch (2-1/2") valve with stainless balls.

Two (2) manually operated swing type valves with Innovative Controls control at the top mount pump panel console shall be installed on the specified discharges. The up and down movement control handles shall be equipped with a squeeze-and-release locking feature. The valves shall be equipped with a color coded name plate.

Two (2) 2-1/2" Noshok discharge pressure gauges (30"-0-400 PSI) shall be provided. The face of the gauge shall be a WHITE dial with black letters. The gauges will be located on the pump instrument panel.

RIGHT SIDE PUMP PANEL -- 3" x 4" DISCHARGE

One (1) 3" discharge shall be installed on the right side pump panel area and shall be controlled by a full

flow 3" slow-close quarter turn ball valve. The discharge shall have 4" NST male hose threads. A color coded nameplate label shall be provided adjacent the control handle.

An Innovative Controls ¾" cast bronze quarter-turn drain/bleeder valve shall be installed. The valve shall be complete with a chrome plated bronze ball, reinforced teflon seals, and blow-out proof stem rated to 600 PSI. A chrome plated zinc handle shall be provided on each drain valve complete with a recessed ID label provision. The handle shall lift to open and push down to close. The valve shall be mounted with an insulating gasket between the valve and the panel to reduce freezing potential.

One (1) lightweight aluminum elbow with 30 degree slant shall be provided. Threads shall be 5" Storz with lugs and manual locks x 4" female swivel NST with rocker lugs.

One (1) 5" lightweight aluminum Storz cap with cable or chain securement shall be provided.

The specified valve shall be an Akron 8000 Series three-inch (3") valve with a stainless ball.

One (1) Akron valve with an Innovative Controls manually operated swing type and control at the top mount pump panel console shall be provided on the specified discharge. The up and down movement control handle shall be equipped with a squeeze-and-release locking feature. The discharge shall be equipped with a slow-close device. The valve shall be equipped color-coded name plate.

One (1) 2-1/2" Noshok discharge pressure gauges (30"-0-400 PSI) shall be provided. The face of the gauge shall be a WHITE dial with black letters. The gauges will be located on the pump instrument panel.

REAR RIGHT SIDE -- 2-1/2" DISCHARGES

Two (2) 2-1/2" discharges shall be installed on the right side rear panel of the apparatus body and shall be controlled by a quarter turn ball valves on the pump panel. The discharges shall have 2-1/2" NPT x 2-1/2" NST male hose threads. The outlets shall be equipped with an engraved nameplate labels shall be installed adjacent the valve control handles.

Innovative Controls ¾" cast bronze quarter-turn drain/bleeder valves shall be installed. The valves shall be complete with a chrome plated bronze ball, reinforced teflon seals, and blow-out proof stem rated to 600 PSI. A chrome plated zinc handle shall be provided on each drain valve complete with a recessed ID label provision. The handles shall lift to open and push down to close. The valves shall be mounted with an insulating gaskets between the valve and the panel to reduce freezing potential.

Two (2) chrome plated elbows with rocker lugs shall be provided with 2-1/2" NST swivel female x 2-1/2" NST male hose threads, per discharge.

Two (2) 2-1/2" NST rocker lug chrome plated vented caps and cable or chain securement shall be provided, per discharge.

The specified valves shall be an Akron 8000 Series two and one half-inch (2-1/2") valve with stainless balls.

One (1) manually operated swing type valve with Innovative Controls control at the top mount pump panel console shall be installed on each of the specified discharges. The up and down movement control

handle shall be equipped with a squeeze-and-release locking feature. The valves shall be equipped with a color coded name plate.

Two (2) 2-1/2" Noshok discharge pressure gauges (30"-0-400 PSI) shall be provided, per discharge. The face of the gauge shall be a WHITE dial with black letters. The gauges will be located on the pump instrument panel.

3" MONITOR DISCHARGE

One (1) 3" discharge shall be piped to the area over the pump enclosure with 3" NPT male threads provided. The pipe shall be equipped with Victaulic couplings (if necessary) and shall be properly secured to prevent movement when a monitor or deck gun is attached. The quarter turn ball valve shall be controlled on pump panel.

A color coded nameplate label shall be provided adjacent the valve control handle.

An Innovative Controls ¾" cast bronze quarter-turn drain/bleeder valve shall be installed. The valve shall be complete with a chrome plated bronze ball, reinforced teflon seals, and blow-out proof stem rated to 600 PSI. A chrome plated zinc handle shall be provided on each drain valve complete with a recessed ID label provision. The handle shall lift, to open and push down, to close. The valve shall be mounted with an insulating gasket between the valve and the panel to reduce freezing potential.

1250 GPM REMOTE CONTROLLED MONITOR

One (1) Task Force Tips Hurricane RC, model # XFIH-E11A remote controlled monitor shall be provided. The monitor shall be controlled by a monitor mounted switch panel with functions that control rotation, elevation and nozzle patterns.

The monitor shall have the following travel capabilities:

- Full horizontal rotation with travel 225 degrees left and right of center
- A full 180 degrees of vertical travel with stops at straight up and straight down
- Field changeable rotation stops shall be provided at 45, 90 and 135 degrees left and right of center
- Flow capability of 1250 GPM
- Maximum operating pressure of 200 PSI

The electrical controls for the monitor shall be waterproof and utilize current limiting and position encoders to protect the drive train at the ends of travel. Thirty feet of ultra-flex robotic power cable shall be pre-wired to the monitor and include a unique cable guide for the motors. An electrical connection for a TFT remote control nozzle shall be provided. The monitor shall be equipped with large manual override handles for use in the event of power failure.

For resistance to corrosion the monitor shall be constructed from hard coat anodized aluminum with a silver powder coat interior and exterior finish. A built in automatic drain designed to protect the monitor from freezing and a threaded port for an optional pressure gauge shall be provided.

The monitor shall be configured with a 3" ANSI 150 companion flange inlet and 2-1/2" male NH outlet.

Bidder Complies	
Yes	No

WIRELESS REMOTE MONITOR CONTROL STATION

Task Force Tips wireless control station YE-RF-900 for Monsoon, Hurricane, and Tornado series remote control monitors shall be provided.

The wireless transmitter shall be designed for remote usage and operate up to 500 feet away from the vehicle mounted base unit antenna/receiver. The remote control includes switches to control horizontal rotation, vertical elevation and nozzle stream pattern. The switch enclosure shall be weatherproof. The handheld unit shall have four (4) Lithium AA batteries and a storage cradle which shall be installed in a weather protected area. The included receiver antenna shall be installed in an unobstructed open area.

MASTER STREAM NOZZLE

One (1) Task Force Tips Master Stream 1250, # M-ERP1250-NJ electronic remote master stream nozzle shall be provided. The nozzle shall be designed for use on monitors, ladder pipes, deluge guns and aerial platforms. For corrosion resistance the nozzle shall be constructed for lightweight hard coat anodized aluminum.

The nozzle shall have a flow capability of 300 to 1250 GPM at a constant pressure rating of 100 PSI. A UV resistant rubber bumper with integral teeth designed to produce a finger free fog pattern shall be included. A halo ring shall be included to assist with stream shape control. The nozzle shall be suitable for foam solution application and designed to accept the Task Force Tips FJ-LX-M low expansion air aspirating attachment. The nozzle shall be configured with a 2-1/2" female NH swivel rocker lug coupling.

REMOTE CONTROL TELESCOPING MONITOR PIPE

Task Force Tips model # XGA38 3" electrically telescoping waterway shall be installed. The waterway shall be capable of being lowered to deck level (or into a monitor well) for storage and transportation and shall be capable of being raised to an extended height of 18" using panel mounted switches. These switches shall control a 12 volt motor and be capable of moving the waterway in either the raised or lowered position while maintaining the ability to horizontally rotate the monitor device 360 degrees. The motor shall be weatherproof in design and have an accessible manual override control for use in the event power failure occurs.

A sensor shall be located on the waterway that signals a 12 volt indicator light installed in the cab to illuminate to indicate that the monitor is raised.

The aluminum riser shall have a 3" waterway; hard coat anodized finish and be furnished with a 3" Victaulic inlet coupling and a TFT Code RLM male connection for a TFT remote control monitor with TFT Code RLF female inlet.

The specified valve shall be an Akron 8000 Series three-inch (3") valve with a stainless ball.

One (1) Akron valve with an Innovative Controls manually operated swing type and control at the top mount pump panel console shall be provided on the specified discharge. The up and down movement control handle shall be equipped with a squeeze-and-release locking feature. The discharge shall be equipped with a slow-close device. The valve shall be equipped color-coded name plate.

Bidder Complies	
Yes	No

One (1) 2-1/2" Noshok discharge pressure gauges (30"-0-400 PSI) shall be provided. The face of the gauge shall be a WHITE dial with black letters. The gauges will be located on the pump instrument panel.

ELECTRIC REWIND HOSE REEL

One (1) Hannay painted steel hose reel with leak proof ball bearing swing joint, adjustable friction brake, electric rewind shall be installed. The reel shall be plumbed with wire reinforced, high-pressure hose coupled. The reel shall be bolted to a mounting system for easy service or removal.

The hose reel is to be mounted in the upper rear body compartment.

A push button hose reel rewind switch shall be installed to control the electric rewind hose reel. The exact location shall be determined at construction.

One (1) 1" discharge shall be provided and piped from the fire pump to the hose reel with flexible high pressure hose. The quarter turn ball valve shall be controlled on pump panel. A color-coded nameplate label shall be provided near the valve control handle.

An Innovative Controls ¾" cast bronze quarter-turn drain/bleeder valve shall be installed. The valve shall be complete with a chrome plated bronze ball, reinforced teflon seals, and blow-out proof stem rated to 600 PSI. A chrome plated zinc handle shall be provided on each drain valve complete with a recessed ID label provision. The handle shall lift, to open and push down, to close. The valve shall be mounted with an insulating gasket between the valve and the panel to reduce freezing potential.

The specified hose reel shall be piped to the normal pressure side of the fire pump.

One (1) Akron 8000 Series one-inch (1") valve with a stainless ball shall be supplied.

One (1) manually operated swing type valve with Innovative Controls control at the top mount pump panel console shall be installed on the specified discharge. The up and down movement control handle shall be equipped with a squeeze-and-release locking feature. The valve shall be equipped with a color coded name plate.

One (1) 2-1/2" Noshok discharge pressure gauges (30"-0-400 PSI) shall be provided. The face of the gauge shall be a WHITE dial with black letters. The gauges will be located on the pump instrument panel.

Three (3) 50' foot lengths of 1" water hose (150') with pin lug couplings and 800 PSI working pressure shall be provided and mounted on the specified hose reel.

One (1) stainless steel four sided captive type roller assembly shall be provided. The location of the captive rollers shall be:

BOOSTER REEL AIR BLOWOUT

One (1) air blow out shall be provided for the booster reel. The air supply must be supplied from the chassis air system and be connected to a quarter turn valve located on the pump operator's panel.

Bidder Complies	
Yes	No

HOSE REEL PAINTING

The hose reel(s) shall be painted silver grey.

Bidder Complies	
Yes	No

APPARATUS BODY SPECIFICATIONS

TOP MOUNT PUMP ENCLOSURE

The top mount pump enclosure shall be removable and supported from the chassis frame rails. This enclosure will allow independent flexing of the pump enclosure from the body and allow for quick removal. The support structure shall be constructed of extruded aluminum tubing and angle. All pump intake discharge controls are to be mounted above the fire pump at a top mounted operator's control panel to provide around-the-truck visibility.

Access to the top mounted control panel shall be provided from both sides of the truck with a large full width walkway ahead of the control panel. The walkway and running boards shall be bolted in place and shall be constructed of slip-resistant NFPA compliant surfaces. There shall be four (4) rubber shock mounted lights furnished in the lower forward facing panel to illuminate the walkway.

Access to the plumbing area shall be provided from both sides of the truck with a large full width walkway ahead of the control panel. The fire pump, valves and controls shall be accessible for service and maintenance as required by applicable sections of NFPA standards. In addition, a removable aluminum tread plate panel shall be provided on vertical surface on the front surface of the pump enclosure.

Access handrails shall be 1-1/4" in diameter extruded aluminum with chrome plated end brackets shall be provided and installed on each side, for easy access to the walkway.

Engine gauges and master pump gauges shall be mounted on the gauge and valve control panel. Both the upper gauge panel and lower valve control panel to be full width and completely removable for access to the pump compartment. The valve controls and individual pressure gauges to be located on the lower flat surface of the valve control panel.

All valves and control handles shall have removable escutcheons for easy valve service without removing the entire panel.

The following controls and equipment shall be provided on the pump panel or within the pump enclosure:

- Primer.
- Pump and plumbing area service lights.
- Pressure control device and throttle control.
- Fire pump and engine instruments.
- Pump intakes and discharge controls.
- Master intake and discharge gauges.
- Tank fill control.
- Tank suction control.
- Water tank level gauge.
- Pump panel lights.

Bidder Complies	
Yes	No

Speedlay Installation

Speedlay pre-connect hosebeds shall be installed in the forward section of the pump enclosure. The speedlay hosebeds shall have smooth sides and removable grating under the hose area. Provisions shall be provided to secure hose and equipment per requirements of applicable NFPA standards.

ANGLED PUMP HOUSE

The top control pump house shall be angled on each side at the walkway entry point.

FRONT ACCESS PUMP PANEL

A removable front access panel shall be installed on the front of the pump enclosure of the apparatus. The panel shall be constructed of aluminum tread plate and be fastened to the pump enclosure with push button or D-ring type latches.

OPEN DUNNAGE COMPARTMENT -- OVER PUMP ENCLOSURE

One (1) open compartment shall be located on the top of the pump module. The compartment will be constructed as large as space permits with removable slip resistance floor material or decking in the base of the compartment.

LEFT SIDE RUNNING BOARD -- TOP MOUNT PANEL

The left top mount pump panels shall be equipped with a side running board. The running board will extend along the width of the pump enclosure from the forward end of the body module to behind the chassis cab.

The running board shall be constructed of aluminum tread plate, bolted in place with stainless steel fasteners. The step surfaces shall be in compliance to applicable sections of NFPA requirements.

RIGHT SIDE RUNNING BOARD -- TOP MOUNT PANEL

The right top mount pump panel shall be equipped with a side running board. The running board will extend along the width of the pump enclosure from the forward end of the body module to behind the chassis cab.

The running board shall be constructed of aluminum tread plate, bolted in place with stainless steel fasteners. The step surfaces shall be in compliance to applicable sections of NFPA requirements.

PUMP ENCLOSURE ACCESS DOOR -- LEFT SIDE UPPER

A pump panel access door shall be provided on the upper left side of the side mount pump enclosure. The access door shall be approximately 18" high and as wide as possible. The door shall be constructed of black thermoplastic covered aluminum with push button type latches.

Bidder Complies	
Yes	No

PUMP ENCLOSURE ACCESS DOOR -- RIGHT SIDE UPPER

A pump panel access door shall be provided on the upper right side of the side mount pump enclosure. The access door shall be approximately 18" high and as wide as possible. The door shall be constructed of black thermoplastic covered aluminum with push button type latches.

PUMP PANEL -- TOP MOUNT

The left hand, right hand, and top mount pump panels shall be constructed of black thermoplastic coating aluminum material and be fastened to the pump enclosure with 1/4" stainless steel bolts.

LEFT SIDE PUMP PANEL -- BOLTED

The pump panel installed on the left hand side of the pump enclosure shall be fastened to the pump enclosure with 1/4" stainless steel bolts.

RIGHT SIDE PUMP PANEL -- BOLTED

The pump panel installed on the right hand side of the pump enclosure shall be fastened to the pump enclosure with 1/4" stainless steel bolts.

PUMP PANEL COLOR TRIM PANELS

Innovative Controls intake and discharge trim rings shall be installed to the apparatus with mounting bolts. These bezel assemblies will be used to identify intake and discharge ports with color and verbiage. These trim rings are designed and manufactured to withstand the specified apparatus service environment and shall be backed by a warranty equal to that of the exterior paint and finish. The specified assemblies feature a chrome-plated panel-mount bezel with durable UV resistant polycarbonate inserts. These UV resistant polycarbonate graphic inserts shall be sub-surface screen printed to eliminate the possibility of wear and protect the inks from fading. All insert labels shall be backed with 3M permanent adhesive (200MP), which meets UL969 and NFPA standards

PUMP ENCLOSURE HEAT PAN

A removable casing constructed of galvanized steel, completely enclosing the underside of the pump compartment and heated by the engine exhaust shall be provided. The heat pan assembly shall include individual panels that can be easily removed from there mounting locations. The two outer slide-out panels shall be bolted in place.

BODY AND PUMP HOUSE FLEX JOINT RUBBER GASKET

A flexible rubber gasket shall be installed between the pump compartment and the apparatus body. This gasket will be designed to seal the pump compartment to the apparatus body as tightly as practical. This gasket is necessary for winter operation in extremely cold climates.

INTAKE / DISCHARGE RUBBER GASKET

All intakes and discharges extending through the side pump panels shall have a rubber grommet installed for heat retention.

Bidder Complies	
Yes	No

LABELS

Safety, information, data, and instruction labels for apparatus shall be provided and installed at the operator's instrument panel.

The labels shall include rated capacities, pressure ratings, and engine speeds as determined by the certification tests. The no-load governed speed of the engine, as stated by the engine manufacturer, shall also be included.

The labels shall be provided with all information and be attached to the apparatus prior to delivery.

COLOR CODED PUMP PANEL LABELING AND NAMEPLATES

Discharge and intake valve controls shall be color coded in compliance to guidelines of applicable sections of NFPA standards.

Innovative Controls permanent type nameplates and instruction panels shall be installed on the pump panel for safe operation of the pumping equipment and controls.

PUMP PANEL LIGHTS -- TOP MOUNT

Three (3) Weldon #2025 or equal lights with clear lenses shall be installed under an instrument panel light hood along the full width of the top mount pump panel. Each side the pump enclosure shall be two (2) lights with light hood, controlled by the switch on pump panel.

PUMP PANEL LIGHTS

One (1) pump panel light shall be illuminated at the time the fire pump is engaged into operation. The remaining lights shall be controlled by a switch located on the operator's instrument panel.

MASTER DISCHARGE AND INTAKE GAUGES

Two (2) 4" diameter Noshok discharge pressure and intake gauges (30"-0-600 PSI) shall be provided. The face of the gauge shall be a WHITE dial with black letters. The gauges will be located on the pump instrument panel.

The master gauges shall have clear scratch resistant molded crystals with captive O-ring seals shall be used to ensure distortion free viewing and to seal the gauge. The gauges shall be filled with a synthetic mixture to dampen shock and vibration, lubricate the internal mechanisms, prevent lens condensation and ensure proper operation from –40□F to +160□F. Each gauge shall exceed ANSI B40.1 Grade A requirements with an accuracy of +/- 1.5% full scale and include a size appropriate phosphorous bronze bourdon tube with a reinforced lap joint and large tube base to increase the tube life and gauge accuracy. A polished chrome-plated brass bezel shall be provided to prevent corrosion and protect the lens and gauge case.

TEST TAPS

Test taps for pump intake and pump pressure shall be provided on the pump instrument panel and be properly labeled.

Bidder Complies	
Yes	No

WATER TANK GAUGE

One (1) Fire Research TankVision model WLA200-A00 tank indicator kit shall be installed on the pump panel. The kit shall include an electronic indicator module, a pressure sensor, and a 10' sensor cable. The indicator shall show the volume of water in the tank on nine (9) easy to see super bright LEDs. A wide view lens over the LEDs shall provide for a viewing angle of 180 degrees. The indicator case shall be waterproof, manufactured of aluminum, and have a distinctive blue label.

The program features shall be accessed from the front of the indicator module. The program shall support self-diagnostics capabilities, self-calibration, and a data link to connect remote indicators. Low water warnings shall include flashing LEDs at 1/4 tank, down chasing LEDs when the tank is almost empty, and an output for an audio alarm.

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

WATER TANK LEVEL LIGHTS

Two (2) Whelen PS-TANK vertically mounted LED lights shall be installed one each side of the apparatus to allow for monitoring the water tank level from a distance.

They shall be configured as follows:

- GREEN - Position 1 indicates FULL
- BLUE - Position 2 indicates 3/4
- AMBER - Position 3 indicates 1/2
- RED - Position 4 indicates 1/4

Each light shall remain illuminated until the water level drops below full 3/4, 1/2, or 1/4 levels. When the level drops below 1/4 the RED light will flash to indicate an empty tank. The Whelen PS-TANK water tank level lights shall be controlled with a Fire Research Corporation TankVision remote driver.

The mounting locations shall be determined at the pre-construction conference.

WATER TANK - 1000 GALLON

The apparatus shall be equipped with a one-thousand (1000) gallon polypropylene water tank. The tank shall be equipped with a four-inch (4") overflow pipe (a six-inch (6") overflow pipe shall be provided if required by dump valve installation).

WATER TANK

The apparatus shall be equipped with a “T" shaped tank.

WATER TANK FILL TOWER

A fill tower measuring approximately 10” x 10” square shall be provided on the water tank up to and

including 1500 gallons total capacity.

The apparatus shall be equipped with a polypropylene water tank. The tank body and end bulkheads shall be constructed of .5" thick, polypropylene, nitrogen-welded and tested inside and out. Tank construction shall conform to applicable NFPA standards. The tank shall carry a lifetime warranty.

The transverse and longitudinal .375" thick swash partitions shall be interlocked and welded to each other as well as to the walls of the tank. The partitions shall be designed and equipped with vent holes to permit air and liquid movement between compartments.

The .5" thick cover shall be recessed .375" from the top of the side walls. Hold down dowels shall extend through and be welded to both the covers and the transverse partitions, providing rigidity during fast fill operations. Drilled and tapped holes for lifting eyes shall be provided in the top area of the booster tank.

A combination vent/water fill tower shall be provided at front of the tank. The 0.5" thick polypropylene fill and overflow tower shall be equipped with a hinged lid and a removable polypropylene screen. The overflow tube shall be installed in fill tower and piped with a minimum schedule 40 PVC pipe through the tank.

The water tank sump shall be located in the forward area of the tank. There will be a schedule 40 polypropylene tank suction pipe from the front of the tank to the tank sump. The tank drain and clean out shall be located in the bottom of the tank sump. The sump shall have a minimum 3" threaded outlet on the bottom to be used for a combination clean out and drain.

The pump to tank refill connection shall be a sized to mate with tank fill discharge line. A deflector shield inside the tank will also be provided.

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. In cases where overall height of the tank exceeds 40 inches, cross member spacing must be decreased to allow for not more than 400 square inches of unsupported area.

The tank must be isolated from the cross members through the use of hard rubber strips with a minimum thickness and width dimension of 1/4” x 1” and a hardness of approximately 60 durometer. The rubber must be installed so it will not become dislodged during normal operation of the vehicle. Additionally, the tank must be supported around the entire bottom outside perimeter and captured both in the front and rear as well as side to side to prevent tank from shifting during vehicle operation.
A picture frame type cradle mount with a minimum of 2" x 2" x 1/4” mild steel, stainless steel, or aluminum angle shall be provided or the use of corner angles having a minimum dimension of 4" x 4" x 1/4” by 6” high are permitted for the purpose of capturing the tank.

Although the tank is designed on a free floating suspension principle, it is required that the tank have adequate vertical hold down restraints to minimize movement during vehicle operation. If proper retention has not been incorporated into the apparatus hose floor structure, an optional mounting restraint system shall be located on top of the tank, half way between the front and the rear on each side of the tank. These stops can be constructed of steel, stainless steel or aluminum angle having minimum dimensions of 3" x 3" x 1/4” and shall be approximately 6” to 12” long. These brackets must incorporate rubber isolating pads with a minimum thickness of 1/4” inch and a hardness of 60 durometer affixed on

the underside of the angle. The angle should then be bolted to the body side walls of the vehicle while extending down to rest on the top outside edge of the upper side wall of the tank.

Hose beds floors must be so designed that the floor slat supports extend full width from side wall to side wall and are not permitted to drop off the edge of the tank or in any way come in contact with the individual covers where a puncture could occur. Tank top must be capable of supporting loads up to 200 lbs per sq. foot when evenly distributed. Other equipment such as generators, portable pumps, etc. must not be mounted directly to the tank top unless provisions have been designed into the tank for that purpose. The tank shall be completely removable without disturbing or dismantling the apparatus structure.

The tank construction shall include PolyProSeal^{TM} technology wherein a sealant shall be installed between the plastic components prior to being fusion welded. This sealing method shall provide a liquid barrier, offering leak protection in the event of a weld compromise.

The tank shall be equipped with Polychromatic fill towers. The water fill tower shall be blue in color. The foam tank fill towers, if applicable, shall be yellow for foam A and green for foam B and black for any additional foam fill towers.

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

The tank shall be manufactured by United Plastic Fabricating (UPF).

HOSEBED SINGLE AXLE

The hose bed compartment deck shall be constructed entirely from maintenance-free, extruded aluminum slats. The slats shall have an anodized, radiused ribbed top surface. The slats shall be of widths approximately 3/4" high x 6" wide and shall be welded into a one-piece grid system to prevent the accumulation of water and allow ventilation to assist in drying hose.

The apparatus hose body shall be properly reinforced without the use of angles or structural shapes and free from all projections that might injure the fire hose.

The main apparatus hose body shall run the full length of the apparatus body from behind the pump panel area to the rear face of the body.

The upper rear interior of the hose body on the right and left sides shall be overlaid with brushed stainless steel to protect the painted surface from damage by hose couplings.

HOSE BED STORAGE CAPACITY

The hose bed shall be designed to have a storage capacity for a minimum of 55 cubic feet of fire department supplied fire hose.

Bidder Complies	
Yes	No

ALUMINUM HOSEBED DIVIDER

Two (2) adjustable hosebed dividers constructed of .250" aluminum shall be installed on the apparatus.

Each hosebed divider installed on the apparatus shall be provided with a hand hole cut-out approximately 3" wide x 8" long.

VINYL HOSEBED COVER

The apparatus shall be equipped with a vinyl hosebed cover.

The cover, approximately 74” wide, shall be secured utilizing a Velcro fastening system at the front and sides of the hosebed body.

The color of the vinyl shall be determined at the pre-construction conference.

3/16" ALUMINUM BODY

The body shall be fabricated of aluminum extrusions, smooth aluminum sheet and aluminum treadplate.

The aluminum extrusion alloy shall be 6061 with a temper rating of T6, and have a tensile strength of 45,000 PSI and yield strength of 40,000 pounds. The aluminum extrusions shall 3" x 3" aluminum tubing, 1-3/4" x 3" aluminum tubing and 3" x 3" aluminum angle and specially designed extrusions, up to .250" wall thickness where applicable.

The smooth aluminum sheet material alloy shall be 5052 with a temper rating of H32, and have a tensile strength of 33,000 PSI and yield strength of 28,000 pounds.

The aluminum treadplate alloy shall be 3003 with a temper rating of H22, and have a tensile strength of 30,000 PSI and yield strength of 28,000 pounds.

The extrusions shall be designed as structural-framing members with the smooth aluminum and treadplate fabricated to form compartments, hosebeds, and floors. All aluminum material shall be welded together using the latest mig spray pulse arc welding system.

Compartment floors shall be of the sweep out design with the floor higher than the compartment door lip and to be water and dust proof. All compartments shall be made to the maximum practical dimensions to provide maximum storage capacity. To ensure maximum storage space, the apparatus shall be constructed without any void spaces between the body and the compartment walls. Double wall construction does not meet this requirement.

All exterior compartments shall have polished aluminum drip moldings installed above the doors where necessary to prevent water from entering the compartments.

Wheel well panels shall be formed aluminum that is welded in place. There shall be no visible bolt heads, retention nuts or fasteners on the exterior surface of the panel. To fully protect the wheel well area from road debris and to aid in cleaning, a full depth radius wheel well liner shall be provided. The frame side of the wheel well area on each side of the opening shall be attached to the frame side of the

front and rear compartments. All seams on the frame side of the body shall be welded and caulked to prevent moisture from entering the compartments.

The rear wheel wells shall be radius cut for a streamlined appearance. A polished aluminum fenderette shall be furnished at each rear wheel well opening, held in place with stainless steel fasteners.

FASTENERS

All aluminum and stainless steel components shall be attached using stainless steel fasteners.

Compartment door hinges, handrails and running boards shall be attached using minimum 1/4" diameter machine bolt fasteners.

3/16" diameter fasteners shall only be used in nonstructural areas such as; door handles, trim moldings, gauge mounting, etc.

COMPARTMENT FLOORS

The compartment floors shall be constructed of smooth aluminum material, to match the compartment interior walls.

GALVANIZED SUB-FRAME

The apparatus body subframe shall be constructed entirely of heavy steel structural channel material.

Two full frame lengths, three-inch (3") 3.4 pound per foot longitudinal steel channels shall form the sides of the body subframe and sides of the water tank cradle. Subframe crossmembers shall be fabricated with three inch (3") 3.4 pound per foot heavy steel channel cross members welded to the longitudinal body subframe sides and the full length frame pads.

Two full frame lengths 1/2" x 3" flat steel frame pads shall be attached to the body subframe and rest on top of the chassis frame rails for proper frame weight distribution.

The steel frame pads, longitudinal steel channels and subframe crossmembers shall be attached to the chassis frame rails using heavy "U" bolt fasteners to allow removal of the subframe and body assembly from the chassis. There shall be a barrier provided between the subframe and body to prevent electrolysis.

The rear subframe and lower body platform support members shall be of the "two piece" design, fabricated of 3.4 lb. per foot heavy channel and welded to the full length subframe channel liners at the rear.

A minimum of two rear platform support channels shall be provided and constructed of 3.4 lb. per foot heavy steel material. Each support channel shall have welded in gusset where the support meets the rear subframe rails.

After fabrication the entire subframe assembly shall be hot dip galvanized to prevent corrosion. The hot dip galvanized subframe shall have a lifetime warranty against failure due to corrosion.

Bidder Complies	
Yes	No

This steel subframe shall carry the weight of the apparatus body, tank, water and equipment. This method of apparatus construction gives an excellent strength/weight ratio.

BODY CONFIGURATION

The aluminum apparatus body shall be up to 144" long.

SINGLE AXLE WHEEL AREA

For ease of accessibility and maintenance, wheel well panels shall be double break formed painted smooth plate that is welded in place.

To fully protect the wheel well area from road debris and to aid in cleaning, a full depth (minimum of 25") radius wheel well liner shall be provided. Wheel well liner shall be smooth aluminum to prevent corrosion.

FENDERETTES

The rear wheel wells shall be radius cut for a streamlined appearance. A polished aluminum fenderette shall be furnished at each rear wheel well opening, held in place with concealed stainless steel fasteners.

BODY WIDTH

The overall width of the pumper body shall not exceed 102".

COMPARTMENT DEPTH

The side compartments on the pumper body shall have the following dimensions:

Lower portion depth of 26"
Upper portion depth of 16"

HOSEBED WIDTH

The width of the pumper body hosebed shall be 68".

BODY WIDTH

The overall width of the pumper body shall not exceed 102".

COMPARTMENT HEIGHT

The left side body compartments shall be 63" high.

COMPARTMENT HEIGHT

The right side body compartments shall be 63" high.

Bidder Complies	
Yes	No

ROLL UP DOOR CONSTRUCTION

The roll up door(s) shall be fabricated from aluminum extrusions and be manufactured and assembled in the United States.

The door slats shall be double-wall extrusions with dimensions of 1.366" high x .315" thick. The exterior surface shall be flat and the interior surface concave to deflect loose equipment to prevent the door from jamming. Each slat shall have interlocking end shoes to prevent the slat from moving side to side resulting in binding of the door. Each slat shall be separated by a co-extruded PVC and rubber inner seal to prevent metal to metal contact and minimize dirt and moisture from entering the compartment. The inner seal shall not be visible from the exterior to maintain a clean appearance of door. The slats shall have interlocking joints with a folding locking flange to provide security and prevent penetration by sharp objects.

The track shall be a one (1) piece aluminum assembly that has an attaching flange and finishing flange incorporated into the design that facilitates installation and provides a finished look to the door without additional trim or caulking. A low profile side seal shall be utilized to maximize usable compartment space.

A drip rail designed to prevent water from dripping into the compartment shall be provided. The drip rail shall have a built in replaceable non-contacting seal to eliminate scratching of the surface of the door.

Bottom rail extrusion must have smooth back to prevent loose equipment from jamming the door and have “V” shaped double seal to prevent water and debris from entering the compartment. The door latch system shall be a full width one (1) piece lift bar that enables the user to operate with one hand.

The roll mechanism shall have a clip system that connects the curtain slats to the operator drum to allow for easy tension adjustment without tools. A four (4) inch diameter counterbalanced operator drum to shall be incorporated to assist in lifting the door.

ROLL UP DOOR

ROM Tall Bottom Rail adds an additional 1-1/2" clearance between the lift bar and the threshold. The same clean ROM bottom rail look is preserved while providing adequate hand clearance while wearing gloves.

EZ-PULL DOWN STRAPS

Elastic nylon straps shall be provided and installed on each roll up door. The straps shall be secured to the side wall of the interior compartment in a way that will allow the EZ-Pull strap to contract automatically and tuck inside the compartment when closed to prevent the strap from dangling and hindering closing of the door. When the door is the open position, the straps shall be installed so that they are fully extended as to not interfere with removing items from the compartment. For the ease of locating, the straps shall be bright orange in color.

LEFT FRONT COMPARTMENT

There shall be one (1) full height compartment located ahead of the rear wheels. The compartment shall be equipped with a full height single natural finish roll up door.

Bidder Complies	
Yes	No

The compartment shall be equipped with the following:

LOUVER

One (1) louver with filter shall be installed in the compartment.

ADJUSTABLE SHELVING TRACKS

The compartments shall be equipped with two (2) aluminum adjustable tracks, vertically mounted, that are bolted in place for adjustable shelving and equipment mounting.

ADJUSTABLE SHELVES

Two (2) adjustable shelves shall be constructed of .188" smooth aluminum plate with 1.5" formed vertical lip front & back. Shelf supports on each side to be constructed of .188" aluminum and bolted to an aluminum extrusion (mounted vertically) by use of 3/8" bolts and spring-loaded cam locks. If shelf is longer than 40" a reinforcement by aluminum gusset is to be placed full-length on bottom of shelf.

500# ROLLOUT TRAY

One (1) roll-out equipment tray shall be installed in the compartment. The tray with telescoping slides and cam follower bearings shall be rated to a maximum load of 500 lbs. The tray shall have a gas shock to hold the tray extended or closed. There shall be a lock to prevent movement, when the tray is in the closed position.

The tray shall be formed of .188" smooth aluminum plate, fabricated with two (2) inch sides. Reflective material measuring 1" x 6" shall be installed on each front corner both on the face and side of tray for firefighter safety.

COMPARTMENT LIGHTS

Two (2) 54" long Whelen Fluorent™ Plus Model F54PC LED lights shall be installed, one each side of the door opening. Each light shall contain two (2) LEDs per inch producing approximately 540 lumens. The lights shall have a 5/8" clear polycarbonate tube enclosure for sever duty applications and silicone rubber end caps for a superior sealed fit around light tube and wires. The lights shall be provided with a 5 year HDP® Heavy Duty Professional warranty.

The lights shall be waterproof and be connectible via a jumper wire to add additional lights in series if required.

The compartment light will be controlled by an automatic "On-Off" switch located on each compartment door.

LEFT OVERWHEEL COMPARTMENT

There shall be one (1) compartment above the rear wheels. The compartment shall be equipped with a single natural finish roll up door.

Bidder Complies	
Yes	No

The compartment shall be equipped with the following:

LOUVER

One (1) louver with filter shall be installed in the compartment.

ADJUSTABLE SHELVING TRACKS

The compartments shall be equipped with two (2) aluminum adjustable tracks, vertically mounted, that are bolted in place for adjustable shelving and equipment mounting.

ALUMINUM ON BACK WALL OF COMPARTMENT

There shall be one (1) 3/16" aluminum panel bolted to the back wall of the compartment for the purpose of mounting equipment. Spacers shall be used to create ½" space between the aluminum mounting panel and the compartment wall.

The aluminum mounting panel shall be mounted in the following compartments:

COMPARTMENT LIGHTS

Two (2) 18" long Whelen Fluorent™ Plus Model F18PC LED lights shall be installed, one each side of the door opening. Each light shall contain two (2) LEDs per inch producing approximately 120 lumens. The lights shall have a 5/8" clear polycarbonate tube enclosure for sever duty applications and silicone rubber end caps for a superior sealed fit around light tube and wires. The lights shall be provided with a 5 year HDP® Heavy Duty Professional warranty.
The lights shall be waterproof and be connectible via a jumper wire to add additional lights in series if required.

The compartment light will be controlled by an automatic "On-Off" switch located on each compartment door.

LEFT REAR COMPARTMENT

There shall be one (1) full height compartment located behind the rear wheels. The compartment shall be equipped with a full height single natural finish roll up door.

The compartment shall be equipped with the following:

LOUVER

One (1) louver with filter shall be installed in the compartment.

ADJUSTABLE SHELVING TRACKS

The compartments shall be equipped with two (2) aluminum adjustable tracks, vertically mounted, that are bolted in place for adjustable shelving and equipment mounting.

ADJUSTABLE SHELVES

Two (2) adjustable shelves shall be constructed of .188" smooth aluminum plate with 1.5" formed vertical lip front & back. Shelf supports on each side to be constructed of .188" aluminum and bolted to an aluminum extrusion (mounted vertically) by use of 3/8" bolts and spring-loaded cam locks. If shelf is longer than 40" a reinforcement by aluminum gusset is to be placed full-length on bottom of shelf.

COMPARTMENT LIGHTS

Two (2) 54" long Whelen Fluorent™ Plus Model F54PC LED lights shall be installed, one each side of the door opening. Each light shall contain two (2) LEDs per inch producing approximately 540 lumens. The lights shall have a 5/8" clear polycarbonate tube enclosure for sever duty applications and silicone rubber end caps for a superior sealed fit around light tube and wires. The lights shall be provided with a 5 year HDP® Heavy Duty Professional warranty.

The lights shall be waterproof and be connectible via a jumper wire to add additional lights in series if required.

The compartment light will be controlled by an automatic "On-Off" switch located on each compartment door.

RIGHT FRONT COMPARTMENT

There shall be one (1) full height compartment located ahead of the rear wheels. The compartment shall be equipped with a full height single natural finish roll up door.
The compartment shall be equipped with the following:

LOUVER

One (1) louver with filter shall be installed in the compartment.

ADJUSTABLE SHELVING TRACKS

The compartments shall be equipped with two (2) aluminum adjustable tracks, vertically mounted, that are bolted in place for adjustable shelving and equipment mounting.

ADJUSTABLE SHELVES

Two (2) adjustable shelves shall be constructed of .188" smooth aluminum plate with 1.5" formed vertical lip front & back. Shelf supports on each side to be constructed of .188" aluminum and bolted to an aluminum extrusion (mounted vertically) by use of 3/8" bolts and spring-loaded cam locks. If shelf is longer than 40" a reinforcement by aluminum gusset is to be placed full-length on bottom of shelf.

500# ROLLOUT TRAY

One (1) roll-out equipment tray shall be installed in the compartment. The tray with telescoping slides and cam follower bearings shall be rated to a maximum load of 500 lbs. The tray shall have a gas shock

to hold the tray extended or closed. There shall be a lock to prevent movement, when the tray is in the closed position.

The tray shall be formed of .188" smooth aluminum plate, fabricated with two (2) inch sides. Reflective material measuring 1" x 6" shall be installed on the each front corner both on the face and side of tray for firefighter safety.

COMPARTMENT LIGHTS

Two (2) 54" long Whelen Fluorent™ Plus Model F54PC LED lights shall be installed, one each side of the door opening. Each light shall contain two (2) LEDs per inch producing approximately 540 lumens. The lights shall have a 5/8" clear polycarbonate tube enclosure for sever duty applications and silicone rubber end caps for a superior sealed fit around light tube and wires. The lights shall be provided with a 5 year HDP® Heavy Duty Professional warranty.

The lights shall be waterproof and be connectible via a jumper wire to add additional lights in series if required.

The compartment light will be controlled by an automatic "On-Off" switch located on each compartment door.

RIGHT HIGH SIDE COMPARTMENTS

There shall be one (1) compartment above the rear wheels. The compartment shall be equipped with a single natural finish roll up door.
The compartment shall be equipped with the following:

LOUVER

One (1) louver with filter shall be installed in the compartment.

ADJUSTABLE SHELVING TRACKS

The compartments shall be equipped with two (2) aluminum adjustable tracks, vertically mounted, that are bolted in place for adjustable shelving and equipment mounting.

SWING-OUT ALUMINUM TOOL BOARD

One (1) swing-out vertical tool board assembly constructed of .188" smooth aluminum shall be provided with locks for holding it in the "in" and "out" positions.

The tool board shall have a chrome grab handle, for easy access with a gloved hand.

ALUMINUM ON BACK WALL OF COMPARTMENT

There shall be one (1) 3/16" aluminum panel bolted to the back wall of the compartment for the purpose of mounting equipment. Spacers shall be used to create ½" space between the aluminum mounting panel and the compartment wall.

Bidder Complies	
Yes	No

The aluminum mounting panel shall be mounted in the following compartments:

COMPARTMENT LIGHTS

Two (2) 18" long Whelen Fluorent™ Plus Model F18PC LED lights shall be installed, one each side of the door opening. Each light shall contain two (2) LEDs per inch producing approximately 120 lumens. The lights shall have a 5/8" clear polycarbonate tube enclosure for sever duty applications and silicone rubber end caps for a superior sealed fit around light tube and wires. The lights shall be provided with a 5 year HDP® Heavy Duty Professional warranty.

The lights shall be waterproof and be connectible via a jumper wire to add additional lights in series if required.

The compartment light will be controlled by an automatic "On-Off" switch located on each compartment door.

RIGHT REAR COMPARTMENT

There shall be one (1) full height compartment located behind the rear wheels. The compartment shall be equipped with a full height single natural finish roll up door.

The compartment shall be equipped with the following:

LOUVER

One (1) louver with filter shall be installed in the compartment.

ADJUSTABLE SHELVING TRACKS

The compartments shall be equipped with two (2) aluminum adjustable tracks, vertically mounted, that are bolted in place for adjustable shelving and equipment mounting.

ADJUSTABLE SHELVES

Two (2) adjustable shelves shall be constructed of .188” smooth aluminum plate with 1.5” formed vertical lip front & back. Shelf supports on each side to be constructed of .188” aluminum and bolted to an aluminum extrusion (mounted vertically) by use of 3/8” bolts and spring-loaded cam locks. If shelf is longer than 40” a reinforcement by aluminum gusset is to be placed full-length on bottom of shelf.

COMPARTMENT LIGHTS

Two (2) 54" long Whelen Fluorent™ Plus Model F54PC LED lights shall be installed, one each side of the door opening. Each light shall contain two (2) LEDs per inch producing approximately 540 lumens. The lights shall have a 5/8" clear polycarbonate tube enclosure for sever duty applications and silicone rubber end caps for a superior sealed fit around light tube and wires. The lights shall be provided with a 5 year HDP® Heavy Duty Professional warranty.

The lights shall be waterproof and be connectible via a jumper wire to add additional lights in series if required.

The compartment light will be controlled by an automatic "On-Off" switch located on each compartment door.

REAR BODY CONFIGURATION

The rear of the apparatus body shall be of the flat back design.

REAR CENTER COMPARTMENT

There shall be one (1) low compartment located at the rear of the apparatus. The compartment shall be equipped with a low natural finish roll up door. The compartment shall be open to the rear side compartments, providing a transverse compartment at the rear of the truck.

The compartment shall be equipped with the following:

LOUVER

One (1) louver with filter shall be installed in the compartment.

ADJUSTABLE SHELVING TRACKS

The compartments shall be equipped with two (2) aluminum adjustable tracks, vertically mounted, that are bolted in place for adjustable shelving and equipment mounting.

COMPARTMENT LIGHTS

Two (2) 18" long Whelen Fluorent™ Plus Model F18PC LED lights shall be installed, one each side of the door opening. Each light shall contain two (2) LEDs per inch producing approximately 120 lumens. The lights shall have a 5/8" clear polycarbonate tube enclosure for sever duty applications and silicone rubber end caps for a superior sealed fit around light tube and wires. The lights shall be provided with a 5 year HDP® Heavy Duty Professional warranty.

The lights shall be waterproof and be connectible via a jumper wire to add additional lights in series if required.

The compartment light will be controlled by an automatic "On-Off" switch located on each compartment door.

REAR UPPER COMPARTMENT

There shall be a compartment located at the upper rear of the body. The upper compartment will be non-transverse to the side rear compartments.

The compartment shall be equipped with a hinged lift up door

Bidder Complies	
Yes	No

The compartment door shall be constructed from smooth aluminum to allow for the application of chevron stripe.

The compartment shall be equipped with the following:

COMPARTMENT LIGHT

One (1) incandescent light fixture shall be installed on the ceiling of the exterior compartment of the apparatus. The light shall have a clear lens.

The compartment light will be controlled by an automatic "On-Off" switch located on each compartment door.

REAR STEP - 12” BOLT-ON

A 12" deep step surface shall be provided at the rear of the apparatus body, bolted in place and easily removable for replacement or repair. The tailboard shall be constructed of .188" aluminum diamond plate or equal non-slip surface in compliance with NFPA #1901 standards.

The maximum height of the step assembly shall be no more than 24" from the ground when the apparatus is in the loaded condition. A label shall be provided warning personnel that riding on the rear step while the apparatus is in motion is prohibited.

LADDER MOUNTING SYSTEM

One (1) hydraulic powered end mount ladder mounting system shall be provided. The bracket assembly shall be mounted on the side of the apparatus body and shall comply with all applicable NFPA standards.

LADDER MOUNT LOCATION

The location of the ladder mounting assembly shall be located on the right hand side of the apparatus body.

MOUNTING – LADDER RACK CONTROLS

The controls for the ladder rack shall be mounted on the pump panel, on the same side as the ladder rack.

EXTERIOR FOLDING ATTIC LADDER MOUNTING

An exterior mounting shall be provided for the specified folding attic ladder.

LADDER SOURCE

New ground ladders shall be provided by the body builder.

Bidder Complies	
Yes	No

PIKE POLE MOUNTING BRACKET

Two (2) tubes shall be provided for pike pole mounting. The tube shall have a 2" interior diameter and shall be mounted on the outside of the apparatus body.

The specified pike pole storage shall be built into the ladder rack.

PIKE POLE SOURCE

The pike poles shall be provided by the body builder.

HARD SUCTION MOUNTING

Two (2) horizontally mounted aluminum hard suction hose tray with Velcro straps shall be provided above the left side body compartments.

SUCTION HOSE SOURCE

New suction hose shall be provided by the body builder.

FOLDING STEPS LEFT SIDE FRONT

Three (3) folding steps of die cast high-strength zinc/aluminum alloy, plated with a superior automotive grade chrome finish shall be provided. The greater than 42 sq. in. serrated non-skid step traction area also offers an oversized non-slip grasp hand-hold. A heavy duty stainless steel spring design firmly holds the step in the open or closed positions. A rubber stop prevents any transit noise and rattles in the closed position. Step lighting shall be from a LED light mounted above the step.

The step has been third part tested to assure conformation of NFPA 1901 and FHA, 49CFR specifications for stepping surfaces and handhold.

The step shall be installed on the left side front compartment face.

FRONT BODY PROTECTION PANELS

Aluminum tread plate overlays and panels shall be installed on the front of the body compartment from the lower edge to the top of the compartment doors.

REAR BODY PROTECTION PANELS

The rear body panels of the body shall be a smooth material, to allow for the proper application and installation of a "Chevron" stripe on the rear.

ACCESS LADDER _EZ CLIMB - LEFT REAR

There shall be a swing out and down access ladder supplied and installed on the apparatus, for accessing the top of the apparatus. It shall be of an all-aluminum design and shall incorporate treads six (6") inches deep and no more than eighteen (18") inches apart. The ground to the first step dimension, on level ground, shall be no more than twenty-four (24") inches. When in the deployed position the ladder

Bidder Complies	
Yes	No

shall have an angle of approximately 75-degrees to facilitate ascending and descending the ladder. The ladder shall be retained in the stowed and deployed position by two (2) gas cylinders and shall not require the use of lathes to hold it in position.

HANDRAIL REAR STEP

Two (2) extruded aluminum non-slip handrails, approximately 30" in length, shall be provided and vertically mounted on the rear of the apparatus, one (1) on each side of the body.

The specified hand rail shall be installed on the rear access ladder.

HANDRAIL BELOW HOSEBED

One (1) extruded aluminum non-slip handrail, approximately 60” in length, shall be provided and horizontally mounted below the hosebed on the rear of the apparatus.

EXTRUDED ALUMINUM RUB RAILS

Full body length polished aluminum rub rails shall be bolted in place on the lower right and left body sides. The side rub rails shall be a heavy extruded aluminum "C" channel.

WHEEL WELL PROVISION LOCATION

The wheel well provisions shall be located on the left side of the apparatus, ahead of the rear wheels.

One (1) breathing air cylinder storage compartment shall be provided and located in the rear wheel well of the apparatus body.

The cylinder storage compartment shall be constructed entirely of aluminum. The door assemblies shall be bolted in-place and removable for repair or replacement.

Compartment shall be provided with SCBA cylinder scuff protection. A brushed aluminum door with push button trigger latch shall be provided.

One (1) one-inch (1") wide loop of black webbing shall be installed in each SCBA compartment to prevent the bottle from sliding out of the compartment in case of door failure. The loop shall be mounted, centered in the compartment and shall hang within one-inch (1") of the compartment floor to allow the bottle to pass by the strap when the bottle is placed in the compartment. The strap shall loop over the valve.

WHEEL WELL PROVISION LOCATION

The wheel well provisions shall be located on the left side of the apparatus, behind of the rear wheels.

FUEL PIPING AND FILL CAP

There shall be a fuel fill cap provided in the recessed area of the left side rear wheel well clearly marked, "DIESEL FUEL ONLY". The fill shall be piped to the fuel tank.

Bidder Complies	
Yes	No

One (1) breathing air cylinder storage compartment shall be provided and located in the rear wheel well of the apparatus body.

The cylinder storage compartment shall be constructed entirely of aluminum. The door assemblies shall be bolted in-place and removable for repair or replacement.

Compartment shall be provided with SCBA cylinder scuff protection. A brushed aluminum door with push button trigger latch shall be provided.

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WHEEL WELL PROVISION LOCATION

The wheel well provisions shall be located on the right side of the apparatus, ahead of the rear wheels.

One (1) breathing air cylinder storage compartment shall be provided and located in the rear wheel well of the apparatus body.

The cylinder storage compartment shall be constructed entirely of aluminum. The door assemblies shall be bolted in-place and removable for repair or replacement.

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Bidder Complies	
Yes	No

allow the bottle to pass by the strap when the bottle is placed in the compartment. The strap shall loop over the valve.

Bidder Complies	
Yes	No

APPARATUS 120 ELECTRICAL SPECIFICATIONS

GENERATOR

One (1) 8 kW PTO driven hydraulically powered generator system shall be supplied and installed. The generator shall be an Onan model CMHG. The generator system shall be capable of producing the nominal output power of 8 kW, 120/240V, 60 Hz. The generator shall be installed per the manufacturer recommendations and shall be capable of supplying full power at engine high idle. The generator field and armature windings shall be of copper magnet wire, coated with class 200 film insulation. The generator alternator shall be capable of accepting a zero power factor load of 200% rated kVA and recover to 90% of rated voltage within 1/2 second.

A Chelsea, Muncie or equal transmission PTO adapter shall be used. The gear ratio of the PTO shall be selected to provide required generator pump speeds with respect to engine speeds. The hydraulic pump can be directly mounted to the PTO using standard SAE flange or the pump can be remote mounted utilizing a driveshaft. Direct mount pumps on the PTO shall have supports per the manufacturer instructions to avoid stress damage to the PTO mounting face. Remotely mounted pumps shall have adequately sized and configured mounting brackets, drive shafts and guarding to prevent entangling injuries.

The compartment or installation location for the generator module shall be made per the manufacturer recommendations. Proper cooling air control, service panel access and exhaust air venting shall be demonstrated. The compartment or location shall have an under tray and adequate structure to support the generator module.

The hydraulic system reservoir shall be mounted at least two inches above the pump and shall have access for fluid filling, draining and viewing the sight glass fluid level indicator. Clearance of at least 10" above the reservoir shall be provided for hydraulic fluid filter service. The fluid shall be Dextron III hydraulic fluid.

All connecting hydraulic hoses and fittings shall be of the size and pressure rating specified by the manufacturer. The hoses shall be adequately protected from chafing or abrasion during operation.

The generator shall be capable of being switched on or off by one or multiple switches as required. The on/off control switch (s) shall be mounted in an area convenient for the driver and/or pump operator as required.

A display meter consisting of 4 numeric LED displays shall be used. The meter shall simultaneously display system voltage, frequency and amperage in each of the two 120V legs. The display shall be mounted in an area clear for operator observation and near the on/off switch.

Data Label

A permanent data label indicating the following information shall be applied:

- Rated voltage
- Phase
- Frequency

Bidder Complies	
Yes	No

- Amperage
- Continuous Watts
- Peak Watts

ELECTRICAL SYSTEM INSTALLATION

The line voltage electrical system shall comply with the applicable NFPA standards and also comply with the applicable sections of the National Electric Code #70 standards. Line voltage carrying equipment downstream of the power source shall be "listed" (where available) and installed in accordance with manufacturer's instructions. The electrical equipment installed shall be suitable for intended use and type locations (wet, dry, or underbody and chassis).

The grounding and bonding shall comply to applicable sections of NFPA standards. The chassis frame rail, body sheet metal, and cab sheet metal shall be properly bonded per NFPA schematic. The bonding copper conductor shall be rated at 115 % of current rating of power source.

Over-Current Protection Panel

Manually re-settable over current devices shall be installed to protect the line voltage electrical system components. A main over current protection device shall be provided. The device shall be either incorporated in the power source or connected to the power source by a power supply assembly. The size of the main over current protection device shall not exceed 100 percent of the nameplate amperage rating on the power source specification label or the rating of the next larger available size over current protection device where so recommended by the power source manufacturer.

The conductor used in the power supply assembly between the output terminals of the power source and the main over current protection device shall not exceed 144 inches in length. If over this distance, a separate master disconnect shall be installed at the generator area.

Over current protection devices shall be provided for each individual circuit and shall be sized at not less than 15 amps in accordance with NEC. Each over current protection device shall be marked to identify the function of the circuit it protects. The circuit breaker panel and instruments shall be located so that all circuit breakers are readily visible under normal operating conditions. The panel shall be readily visible and located so that there is unimpeded access to the panel board controls.

Hydraulic Components

A hydraulic system filter, fluid level gauge, and fluid temperature gauge shall be provided as integral components within the hydraulic reservoir. The reservoir shall be easily accessible to allow filter changes and fluid level checks. There shall be at least 10 inches of clear space above the reservoir to allow removal of the filter element. Interconnecting hoses and fittings shall meet the generator system manufacturer's recommendations for pressure, size, and type of hose used. Where any hydraulic hose contacts other surfaces, the hose shall be protected from chafing. The hydraulic pump shall be driven by a power take-off mounted to the chassis automatic transmission.

Bidder Complies	
Yes	No

Control Panel

The panel shall include the following:
1. Green indicator light to indicate PTO engagement. The light shall be labeled "GENERATOR ENGAGED."
2. Red indicator to indicate hydraulic fluid overheating.
3. Main circuit breaker panel with "main" breaker and individual line breakers.
4. All breakers, outlets, switches, and receptacles shall be labeled per requirements of applicable NFPA standards.
5. The generator shall be capable of producing full rated power throughout the entire RPM range of the engine.

Instruction Label

An instruction label indicating essential generator operating instructions, including power-up and power-down sequence shall be permanently attached at or near the operator's panel.

ELECTRICAL SYSTEM TESTING

All apparatus installed wiring and associated equipment shall be tested by the apparatus manufacturer in compliance to applicable NFPA standards. The apparatus manufacturer shall test the generator system at the continuous duty rating for a minimum of two (2) hours.

If the apparatus is equipped with a fire pump, both the generator and fire pump shall be operated simultaneously at full pump capacity and generator at "continuous rating" for two (2) hours. Failure of either the generator system or fire pump system during testing will require retesting of both components simultaneously.

The conditions specified shall be recorded at least every 1/2 hour during the test. The results of these tests shall be submitted to the purchaser upon delivery.

Each outlet shall be tested individually to device rating.

Electrical polarity verification shall be made of all permanently wired equipment and receptacles to determine that connections have been properly made.

CIRCUIT BREAKER BOX

One (1) circuit breaker box for single phase voltage equipment shall be provided capable of holding twelve (12) breakers.

CIRCUIT BREAKER BOX LOCATION

The circuit breaker box shall be installed in an outside body compartment.

The instrument panel for the generator shall be installed in a side body compartment.

Bidder Complies	
Yes	No

GENERATOR STARTUP

An activation switch for the hydraulic generator shall be installed in the apparatus cab.

GENERATOR MOUNTING LOCATION

The generator shall be installed over the fire pump enclosure.

The gen-set shall be on the RHS below the ladders.

LINE VOLTAGE WIRING INSTALLATION

Line voltage wiring in the apparatus shall be with Type SO or approved cable suitable for mobile applications. The flexible electrical cable shall have 600-volt insulation rated for at least 194 degrees F. All junction boxes shall conform to the National Electric Code and shall be accessible for service.

Electrical cable shall be supported within 6 inches of any junction box and at a minimum of every 24 inches of run. Supports shall be made of corrosion protected metal that does not cut or abrade the conduit or cable and shall be mechanically fastened to the vehicle.

Electrical cable shall not be attached to chassis suspension components, water or fuel lines, air or air brake lines, fire pump piping, hydraulic lines, exhaust system components, or low voltage wiring and shall be separated by a minimum of 12 inches from exhaust piping or properly shielded and separated from fuel lines by a minimum of 6 inches distance.

All wiring connections and terminations shall provide a positive mechanical and electrical connection. Connectors shall be installed in accordance with the manufacturer's instructions. Wire nuts or insulation displacement and insulation piercing connectors shall not be used.

120V ELECTRIC RECEPTACLE -- TWIST LOCK

Four (4) 120-volt 20 amp twist lock (NEMA L5-20) receptacle with spring loaded weatherproof cover shall be provided.

The electric receptacle shall be located near the left side wheel well.

The electric receptacle shall be located near the right side wheel well.

The electric receptacle shall be located on the exterior left rear face of the body.

The electric receptacle shall be located on the exterior right rear face of the body.

ELECTRIC CABLE REEL

One (1) Hannay ECR-1600 series electric cable reel with an electric rewind shall be installed on the vehicle. The reel shall be designed for use with 120 volt, three (3) wire cable. The duty rating of the cable reel shall be for continuous usage. The reel shall be installed so that it is easily accessible for cord access and maintenance. A 12-volt motor controlled by a push button switch located in a convenient position and properly labeled shall perform the electric rewind function.

The installation of the cable reel shall meet applicable sections of the NFPA standards.

Reel Capacity

The reel shall be sized to hold 110 percent of the capacity needed for the specified cable length. The wire size shall be in accordance with the National Electric Code.

Labeling

An information label shall be installed in a location visible adjacent to any permanently connected reel with the following data:

- Voltage
- Phase
- Current type
- Current rating
- Total cable length

Electrical Supply Wiring To Reel

The wiring shall end in a sealed conduit box at the reel with mechanical connectors to allow removal of the reel. Appropriately, sized wire and circuit breakers shall be utilized.

The electric cable reel shall be installed in the left side dunnage area of the pump compartment.

A two hundred foot (200') length of 10/3 black electric cable shall be installed with specified plugs. The cable shall be type SEO-WA with a 20 amp, 120 volt rating.

The electric cable shall be configured with a 120-volt 20 amp NEMA L5-20C three prong, twist lock female receptacle.

One (1) ball stop shall be attached to the electric cable to prevent total re-wind and to allow the cable to remain at a reachable position. The ball shall positively attach to the cable and be bright orange in color for high visibility.

JUNCTION BOX

One (1) Akron yellow electrical junction box shall have a 12" pigtail with a NEMA L5-20 twist-lock plug for connection to the cord reel. The unit shall have an integral pilot light to indicate electrical current.

The unit shall be equipped with four (4) 120 volt 20 amp NEMA L5-20 twist-lock receptacles, each with a hinged, weatherproof cover.

One (1) aluminum storage bracket designed to hold an electric junction box shall be supplied. The holder shall be mounted in the same compartment as the specified cable reel.

One (1) four-sided nylon roller unit for the electric cable shall be installed on specified reels. The roller

unit shall be mounted in the specified location to permit the cable to feed directly off the reel.

The cord reel shall pass through the dunnage area wall on the LHS.

240 WATT/120VOLT TELESCOPIC FLOODLIGHT

One (1) Akron Brass, Extenda-Lite roof mounted brow, item ELSS-XLAC-W-BL shall be provided. Each Brow shall be equipped with a 240 watt light head with the front bezel painted white.

The light head shall contain 48 high power LEDs and a highly polished reflector. The light head shall operate between 90Vac and 135Vac and regulate LED temperature to maximize LED life. There shall be angle tilt-mounting brackets attached to the side of the light housing. The cast aluminum housing shall not exceed 190° F. Each brow light shall be equipped with a twelve-inch pigtail.

The Extenda-Lite Brow Mount components shall have a 5 year warranty. The SceneStar LED head shall have a 6 year warranty and shall be UL listed and ULC listed and carry a CE mark.

FLOODLIGHT - FRONT OF CAB

A floodlight shall be installed on the front center of the cab.

The brow quartz floodlight(s) shall be circuit breaker protected. The circuit breaker(s) shall be used as an ON/OFF switch(es) for the floodlight(s). The circuit breaker(s) shall be labelled "BROW LIGHTS".

LIGHT TOWER

A light tower shall be installed on the cab roof. The roof shall be reinforced for the mounting of a horizontally stored light tower.

LIGHT TOWER

A Command Light, part number KL415A-LED, light tower shall be provided for installation on the apparatus. The location of the light tower and its controls shall be installed according to instructions given by the customer and the requirements of the light tower manufacturer.

The light tower shall extend 130" above the mounting surface and shall extend to full upright position in less than 15 seconds. The overall size of nested light tower shall be approximately 44" wide x 73" long x 12" high and weigh approximately 310 pounds.

Light Tower Construction and Design

The light tower assembly shall be of aluminum construction, with stainless steel shafts and bronze bushings for long life and low maintenance.
The electrically controlled unit shall not require usage of the vehicle's air supply for operation, thereby eliminating the chance for air leaks in the vehicle braking system. Hydraulic or pneumatic type floodlights are not acceptable alternatives to the specified all electric light tower.

The light tower shall be tested to in wind conditions of 90 mph (150 kph) minimum. Other type floodlights that have not been tested to these conditions are not acceptable.

The light tower shall be capable of overhanging the side or back of the vehicle to provide maximum illumination to the vicinity adjacent to the vehicle for the safety of emergency personnel in high traffic conditions. Any tower that is only capable of rotations at the top of a pole is not an acceptable alternative to the specified tower.

Light Tower Electrical System

The light tower shall be a two-stage articulating device with a lighting bank on top of the second stage capable of continuous 360 degree rotation. The light shall be elevated by electric linear actuators, one (1) actuator shall elevate the lower stage and one (1) actuator shall adjust the light bank angle from 0 to 110 degrees. Power for the light bank shall be supplied through power collecting rings thus allowing continuous 360 degree rotation in either direction.

The tower base shall have a light that illuminates the envelope of motion during any movement of the light tower mast as required by NFPA1901.

Light Tower Controls

The light tower shall be controlled with a hand-held 15 foot umbilical line remote control. The storage station for the remote control unit shall be equipped with a button to activate the "Auto-Park" automatic nesting feature. The controls on the remote box shall be:

Three (3) switches, one (1) for each light bank.
One (1) light bank rotation switch.
One (1) switch for elevating lower and upper stage.
One (1) indicator light to indicate when light bank is out of roof nest position.
One (1) indicator light to indicate when light bank is rotated to proper nest position.
One (1) back light rotation switch. (For optional Backlighting)
One (1) on/off switch for the top mounted strobe. (For optional strobe)

Light Tower Floodlights

The Command Light shall be equipped with the following bank of floodlights:

Floodlight manufacturer:	Fire Research Comp- Spectra LED-AC power
Number of lamp heads:	Six(6)
Voltage:	120 volt AC
Watts of each lamp head:	220 Watt FRC
Total watts of light tower:	1320 Watts FRC
Total Lumens of light tower:	120,000 lumens FRC

Bidder Complies	
Yes	No

Configuration: The light heads shall be mounted two (2) on each side of the light tower, giving two (2) vertical lines of three (3) when the lights are in the upright position.

MOUNTING – LIGHT TOWER CONTROLS

The controls for the light tower shall be mounted in the left front compartment.

BACKLIGHT OPTION

One (1) backlight option shall be provided on a Command Light light tower. The lower pair of light heads shall be capable of being rotated about a horizontal axis, providing light down on the vehicle or to the opposite side of the vehicle while four (4) lights remain pointed at the scene.

The hand-held remote control shall have an additional switch supplied for the backlight rotation option.

ALUMINUM TREAD PLATE ROOF SUPPORT

A support panel for the custom chassis cab roof shall be provided. The panel shall be constructed from aluminum tread plate and encompass the entire area below the light tower. The panel mounting areas shall be sealed to prevent water leakage.

LIGHT TOWER ENCLOSURE

A three (3) sided enclosure for the light tower shall be installed. The enclosure shall be constructed from smooth aluminum plate and be designed to protect the components of the light tower from low-lying branches while in transit. The enclosure shall be installed with weather-sealed fasteners.

The enclosure shall be painted to match the upper portion of the cab or body.

Bidder Complies	
Yes	No

APPARATUS PAINT, STRIPPING AND LETTERING SPECIFICATIONS

BODY PAINT PROCESS

All bright metal fittings, if unavailable in stainless steel shall be heavily chrome plated. Iron fittings shall be copper plated prior to chrome plating.

All seams shall be caulked both inside and along the exterior edges with a urethane automotive sealant to prevent moisture from entering between any body panel.

The body and all parts shall be thoroughly washed with a grease cutting solvent (PPG DX330) prior to any sanding. After the body has been sanded and the weld marks and minor imperfections are filled and sanded, the body shall be washed again with (PPG DX330) to remove any contaminants on the surface.

The first coating to be applied is a pre-treat self-etching primer (PPG DX1787) (.5 to 1.0 dry film build) for maximum adhesion to the body material. The next two to four coats (depending on need) shall be an acrylic urethane primer surfacer (PPG K36). The film build shall be 4-6 mils when dry. The primer surfacer coat, after appropriate dry time, shall be sanded with 320-600 grit sandpaper to ensure maximum gloss of the paint. The last step is the application of at least three coats of PPG DelFleet polyurethane two-component color (single stage). The film build being 2-3 mils dry. The single stage polyurethane, when mixed with component (PPG F3270) catalyst shall provide a UV barrier to prevent fading and chalking.

All products and technicians are certified by PPG every two (2) years.

The paint code shall be PPG-FDG82546

INTERIOR COMPARTMENT FINISH

The interior compartment walls shall be coated with a heavy spray on lining material. The compartments shall be cleaned with a wax and grease remover and then caulked with a urethane caulk. The compartments are then sprayed with one coat of epoxy primer, then two to three coats of urethane bed liner. The lining material shall dry to form an impervious one piece covering to protect the compartment interiors from damage. The lining material shall be applied on eight (8) compartments.

INTERIOR COMPARTMENT FINISH

The lining material shall be light grey in color.

TOUCH-UP PAINT

One (1) two (2) ounce bottle of touch-up paint shall be furnished with the completed truck at final delivery.

UNDERCOATING

The entire underside of the single axle apparatus body is to be cleaned and properly prepared for application of a sprayed on automotive type undercoating for added corrosion resistance. Undercoating

Bidder Complies	
Yes	No

is to be a solvent based, rubberized coating, black in color.

SIMULATED GOLD LEAF LETTERING

The lettering shall be applied in simulated gold leaf material, shaded in black and encapsulated in clear Mylar.

A quantity of seventy-five (75), four (4) inch letters are to be placed on the cab and on the body as directed by fire department.

The exact lettering layout shall be determined at the pre-construction conference.

REFLECTIVE STRIPING

A 6" wide 3M brand Scotchlite #680-10 reflective stripe shall be affixed to the perimeter of the vehicle. Striping shall be placed up to 60" above ground level and shall conform to the applicable NFPA reflectivity requirements. At least 50% of the perimeter length of each side and width of the rear and at least 25% of the perimeter width of the front of the vehicle shall have reflective stripe.

The side stripe shall be applied in a "Z" pattern.

The striping details shall be determined at the pre-construction conference.

COLOR OF STRIPING MATERIAL

The color of the 3M brand striping material shall be blue.

CHEVRON STRIPING

The entire rear portion of the body shall have 3M reflective red and amber striping installed. The chevron style striping shall be applied at a 45-degree upward angle pointing towards the center upper portion of the rear panel.

REFLECTIVE STRIPE

Reflective striping shall be installed on the interior of each chassis door.

Bidder Complies	
Yes	No

APPARATUS EQUIPMENT SPECIFICATIONS

WHEEL CHOCKS WITH MOUNTS

A pair of Zico Model SAC-44 Quic-Chok folding wheel chocks shall be provided and mounted under the apparatus body with model SQCH-44H horizontal mounting brackets.

The mounting locations shall be determined at the pre-construction conference.

ROAD SAFETY KIT

One (1) 2-1/2# ABC DOT Approved fire extinguisher shall be provided. The fire extinguisher shall be shipped loose with the chassis.

One (1) set of DOT approved hazard triangles shall be supplied with the chassis. They shall be stored in a plastic case and shipped loose with the chassis.

ROOF LADDER

One (1) Duo Safety Model 775-A, 14 foot aluminum roof ladder with folding steel roof hooks on one end and steel spikes on the other end shall be provided on the apparatus. The ladder shall meet or exceed all latest NFPA Standards.

EXTENSION LADDER

One (1) Duo-Safety Model 900-A, 24 foot two (2) section aluminum extension ladder shall be provided on the apparatus. The ladder shall meet or exceed all the latest NFPA standards.

FOLDING LADDER

One (1) Duo Safety Model 585-A, 10 foot folding aluminum ladder shall be provided on the apparatus. The ladder shall meet or exceed all the latest NFPA Standards.

PIKE POLES

All NFPA required pike poles will be supplied and installed by the Customer before the apparatus is placed into service.

PIKE POLE

One (1) 8' pike pole with round handle shall be provided. The pike pole shall be of fiberglass construction.

PIKE POLE

One (1) 10' pike pole with round handle shall be provided. The pike pole shall be of fiberglass construction.

Bidder Complies	
Yes	No

SUCTION HOSE

Two (2) 6.0" x 10 foot length of PVC flexible suction hose shall be supplied. The suction hose shall have light weight couplings provided.

HOSE COUPLINGS

Lightweight aluminum couplings shall be provided on the suction hose. A long handle female swivel shall be provided on one end and a rocker lug male shall be provided for the other end.

STRAINER

One (1) Kochek Model BS60 barrel strainer shall be provided. The strainer shall be constructed from aluminum with K-Brite finish and include a tie off loop on the end plate. The strainer shall be provided with a 6.0" NST female rocker lug coupling.

STRAINER MOUNTING

One (1) screw type strainer mounting plate shall be provided. The mounting plate shall be cast aluminum and be 6.0" NST thread.

The mounting locations shall be determined at the pre-construction conference.

MISCELLANEOUS HARDWARE

Miscellaneous loose hardware consisting of bolts, nuts, washers, and screws shall be supplied with the apparatus at time of delivery.

Bidder Complies	
Yes	No

APPARATUS WARRANTY SPECIFICATIONS

PAINT WARRANTY FIVE YEAR

The PPG paint performance guarantee will cover the areas of the vehicle finished with the specified product for a period of FIVE (5) years beginning the day the vehicle is delivered to the purchaser.

The full apparatus chassis, manufactured and painted by the manufacturer, shall be covered for the following paint failures as outlined on the guarantee certificate:

- Peeling or delaminating of the topcoat and/or other layers of paint.
- Cracking or checking.
- Loss of gloss caused by cracking, checking, or hazing.
- Any paint failure caused by defective PPG Fleet Finishes, which are covered by this guarantee.

All guarantee exclusions, limitations, and methods of claims are covered in the full certificate provided to the original purchaser.

Note: Surety bond, if required, will cover standard one year warranty period only and will not cover any extended warranties allowed by seller or other component manufacturers.

CAB STRUCTURE WARRANTY

The cab structure shall be warranted for a period of ten (10) years with the complete detail of the warranty outlined in a document provided upon request.

TRANSMISSION WARRANTY

The Allison EVS transmission shall be warranted for a period of five (5) years with the complete detail of the warranty outlined in a document provided upon request.

ENGINE WARRANTY

The Cummins engine shall be warranted for a period of five (5) years or 100,000 miles, whichever comes first, with the complete detail of the warranty outlined in a document provided upon request.

FRAME WARRANTY

The frame and cross members shall carry a lifetime warranty with the complete detail of the warranty outlined in a document provided upon request.

FRONT AND REAR AXLE WARRANTY

The front and rear axles shall be warranted by Meritor for two (2) years with unlimited miles under the general service application.

Bidder Complies	
Yes	No

CAB AND CHASSIS WARRANTY

The cab and chassis shall carry a twenty-four (24) month warranty providing limited parts and labor from the date the complete apparatus is delivered to the end user. The complete detail of the warranty shall be outlined in a document provided upon request.

STATIC LOAD SEAT TEST INFORMATION

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

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

CAB TEST INFORMATION

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

The above tests shall have been witnessed by and attested to by an independent third party. The test results shall have been recorded using cameras, high speed imagers, accelerometers and strain gauges.

Documentation of the testing shall be provided upon request.

CAB INTEGRITY CERTIFICATION

The manufacturer shall provide a cab crash test certification with this proposal including SAE J2422 Cab Roof Strength Evaluation - Quasi-Static Loading for Heavy Trucks and SAE J2420 COE Frontal Strength Evaluation - Dynamic Load for Heavy Trucks.

CAB TEST INFORMATION

Roof Crush
The cab shall be subjected to a roof crush test of 120,000 pounds exceeding the requirements of ECE 29 criteria. The 120,000 requirement is important to ensure to most structurally sound and safe cab in the event of a crash or roll over.

Bidder Complies	
Yes	No

Side Impact
The cab shall be subjected to dynamic moving barrier slammed into the side of the cab at 7.5 mph, striking with an impact of 15,157 foot pounds of energy. This test will closely represent the forces a cab would incur in a rollover incident.

Frontal Impact
The cab shall withstand a frontal force produced from a moving barrier slammed into the front of the cab traveling at 10.5 mph, striking with an impact of 42,587 foot pounds of energy.

The same cab shall withstand all tests without any measurable intrusion into the survival space of the occupant area.

BUMPER TO BUMPER WARRANTY

The manufacturer shall provide a one (1) year bumper-to-bumper warranty. The manufacturer shall supply details of their warranty information with their bid submission.

ALUMINUM BODY WARRANTY - FIVE YEAR

The manufacturer shall provide a five (5) year structural and corrosion perforation warranty for the fabricated aluminum body. The manufacturer shall supply details of their warranty information with their bid submission.

GALVANIZED STEEL SUBFRAME WARRANTY

The manufacturer shall provide a lifetime warranty for the galvanized steel subframe of the apparatus body. The manufacturer shall supply details of their warranty information with their bid submission.

PAINT WARRANTY FIVE YEAR

The manufacturer shall provide a five (5) year paint warranty for all portions of the apparatus that they have painted. The manufacturer shall supply details of their warranty information with their bid submission.

PUMP WARRANTY

The fire pump manufacturer shall provide a five (5) year warranty. The manufacturer shall supply details of their warranty information with their bid submission.

STAINLESS STEEL PLUMBING WARRANTY

The manufacturer shall provide a ten (10) year warranty on the stainless steel plumbing components and installation. The manufacturer shall supply details of their warranty information with their bid submission.

Bidder Complies	
Yes	No

WATER TANK WARRANTY

UNITED PLASTIC FABRICATION INC. Warrants each UPF POLY-TANK IIE Booster/Foam tank to be free from manufacturing defects in material and workmanship for the service life of the vehicle (vehicle must be actively used in fire suppression). The UPF POLY-TANK IIE must be installed in accordance with the United Plastic Fabricating installation manual. Every UPF POLY-TANK IIE is thoroughly inspected and tested for leaks before leaving our facility. Should any problems develop with your UPF POLY-TANK IIE booster/foam tank and will not meet performance criteria during the service life of the vehicle, notify UPF in writing or call our TOLL FREE SERVICE HOT LINE 1-800-USA-POLY. Provide UPF with the serial number and a description of the problem. If the tank problem would render the truck out of service, UPF will dispatch a service technician WITHIN 48 HOURS (2 DAYS) to repair the tank. (This time period is for North America only). If the vehicle can remain in service, UPF will dispatch a service technician within a mutually agreed upon time period.

We will repair, or at our option, replace the tank with a new UPF POLY-Tank IIE. UPF will cover customary and reasonable costs to remove and install the UPF POLY-TANK IIE. This warranty will not cover tanks that have been improperly installed, misused or abused, and the serial number must not have, been altered, defaced or removed. UPF will not cover any unauthorized third party repairs or alterations. Any of these actions may void the warranty.

THERE ARE NO WARRANTIES, EXPRESSED OR IMPLIED, WHICH EXTEND BEYOND THE DESCRIPTION OF THE FACE HEREOF. THERE IS NO EXPRESS OR IMPLIED WARRANTY OF MERCHANTABILITY OR A WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. ADDITIONALLY, THIS WARRANTY IS IN LIEU OF ALL OTHER OBLIGATIONS OR LIABILITIES ON THE PART OF UNITED PLASTIC FABRICATION, INC.

This warranty contains the entire warranty. It is the sole warranty and price agreements or representation, whether oral or written, are either merged herein or expressly cancelled. UNITED PLASTIC FABRICATION, INC. Neither assumes, nor authorizes any person supposing to act on its behalf, to change, nor assume for it, any warranty or liability concerning its product.

IN NO EVENT WILL UNITED PLASTIC FABRICATION, INC BE LIABLE FOR AN AMOUNT IN EXCESS OF THE PRESENT RETAIL, PURCHASE PRICE PLUS INSTALLATION AND REMOVAL COST OF THE BOOSTER TANK, FOR ANY LOSS OR DAMAGE, WHETHER DIRECT OR INDIRECT, INCIDENTAL, CONSEQUENTIAL, OR OTHERWISE ARISING OUT OF FAILURE OF ITS PRODUCT.

This warranty gives you specific legal rights, and you may have other rights, which vary from state to state. Some states do not allow exclusion or limitation of incidental of incidental or consequential damage, so the above limitation or exclusion may not apply to you. Some states do not allow limitation on how long an implied warranty lasts, so the above limitation may not apply to you.

Bidder Complies	
Yes	No

APPARATUS MANUALS AND SUPPORT SPECIFICATIONS

OPERATION AND PARTS LIST MANUALS

Each cab and chassis shall include two (2) electronic copies of the operation manuals and parts listings. The manuals shall include information specific to the components included on the apparatus.

ENGINE AND TRANSMISSION MANUALS

One (1) paper copy of the specific engine and transmission manuals shall accompany each cab and chassis.

COMPLETE PRINTED MANUAL

The manufacturer shall provide with the vehicle upon delivery, one (1) complete delivery manual. This manual shall be in a notebook type binder, with reference tabs for each section of the vehicle. A companion compact disk (CD) with all of the printed material in an electronic format (Adobe Acrobat PDF) shall be provided.

Within each section shall be:

- Individual component manufacturer instruction and parts manuals
- Warranty forms for the body
- Warranty forms for all major components
- Warranty instructions and format to be used in compliance with warranty obligations
- Wiring diagrams
- Installation instruction and drawings for major parts
- Visual graphics and electronic photos for the installation of major parts
- Necessary normal routine service forms, publications and components of the body portion
- of the apparatus
- Technical publications for training and instruction on major body components
- Warning and safety related notices for personnel protection
- Cab and chassis manuals on parts, service and maintenance shall be provided

The manufacturer shall supply details of their manual information with their bid submission.

"ON-LINE" SERVICE MANUAL SUPPORT

As part of the standard delivery manual, the manufacturer shall give a password-protected link to the end user, allowing access to the manufacturers' database on service parts. The internet-based system shall allow the end user to access the major component supplier's service parts listing such as Hale, Waterous, Akron, etc. This shall be accomplished with simplistic point and click features on the manufacturer line item within the "stripper" or "line sheet". This will include automatic updates, printable schematics, and manufacturer's web links and is available in a commercially available format of Adobe Acrobat Reader to access these documents. The manufacturer shall submit with the bid proposal, a sample set of on line Adobe formatted material that has been printed from the manufacturer’s website. Failure to do so will result in rejection of

the proposal. Reference to "on delivery" or "at pre-build" submission is not an acceptable response for the bid document.

Parts Listings within Manuals

The manuals will include cross-reference part numbers from the apparatus manufacturers' part number to the vendor parts. Example: Brand X Fire Apparatus, Hydraulic Ladder Rack, Part #WW-MN-0302 cross-referenced to Ziamatic Corporation Part 098-MN2345. This will allow for reference between individual parts and complete installation assemblies as completed by the body builder. The manuals will list all components of the vehicle that includes a vendor part utilized in a complete installation via the manufacturers "line item sheet" or "stripper" utilized to manufacture the completed vehicle. These are "As Built" and proposals with "typical" or "generic" manuals will be rejected.

Illustrative Schematics within Manuals

The manufacturer shall include installation diagrams and drawings of all major sub-assemblies. This will include components such as hydraulic ladder rack assemblies, pump panels, tanks, fire pumps, etc. The drawings shall be linked via an Internet based service program, in an electronic format from the manufacturers “stripper” (line item listing) of the manufacturing document. The manufacturer shall submit, with the bid proposal, a sample schematic. Failure to do so will result in rejection of the proposal. Reference to "on delivery" or "at pre-build" submission is not an acceptable response for the bid document.

Digital Images within Manuals

In addition to two and three-dimensional installation drawings, the manufacturer shall make accessible, via an internet based link, the actual photos of the installed components listed within the "stripper" or line sheet. This will include, but not limited to Wiring terminals, main body distribution strips, fire pump shifting, auxiliary components, etc. The manufacturer shall submit a sample of these with the bid submission. Failure to submit the digital images with the bid will result in rejection of the proposal. Reference to "on delivery" or "at pre-build" submission is not an acceptable response for the bid document.

Installation Instructions within Manuals

The manufacturers "work instructions" or "installation instructions" shall be included with the service manuals. These documents shall be accessible via a web-based link to the individual vehicle manufactured. The work instructions shall give systematic instructions of the installation process. The manufacturer shall submit, with the bid proposal, a sample set of instructions. Failure to do so will result in rejection of the proposal. Reference to "on delivery" or "at pre-build" submission is not an acceptable response for the bid document.

Automatic Updates of Manuals and Parts Listings

The online manuals will include automatic updates that are accessible via the web link. When clicking on the part within the manufacturer's stripper or line sheet, it will allow the end user to access the component manufacturer website for updated information. This will allow for latest parts and service components from the individual part manufacturer or vendor.

Electrical Schematics

To maintain the vehicles electrical systems, the manufacturer shall provide to the purchaser the instructional manuals, complete electrical information and schematics on the vehicle. The electrical information shall be provided as follows:

Wiring Systems 12 and 120 Volt:

- Graphic symbols for electrical diagrams.
- Wire labeling, imprinting codes and index.
- Computer generated electrical schematics indicating the circuit number, wire size, switches, circuit breaker and terminals on the vehicle.

The manufacturer shall submit, with the bid proposal, a sample set of diagrams. Failure to do so will result in rejection of the proposal. Reference to "on delivery" or "at pre-build" submission is not an acceptable response for the bid document.

"ON-LINE" WARRANTY TRACKING SYSTEM

The manufacturer shall provide an online warranty tracking system which shall be used to track all service and warranty issues.

The tracking system will show real time information on all warranty and service requests. A user will be able to create or track the status of their service or warranty requests 24 hours a day, 7 days a week from anywhere with an internet connection.

The warranty / service tracking system shall be capable of tracking all department service issues via truck VIN or job number.

The system must provide user with instant confirmation of receipt of warranty or service request and must not require user to purchase or use proprietary software.

AS BUILT WIRING DIAGRAMS

Each cab and chassis shall include one (1) digital copy of the wiring schematics and component wiring. The wiring schematics shall be developed on a software program such as VeSys Design or equal that provides continuity in files and diagram. The software shall allow you to trace through the design schematics to identify cross referenced items such as in-line connectors and wires. The software shall be interactive which allows you to view one electrical assembly drawing, click on a wire routing and the program will take you to the related circuit assembly or termination point. The software shall also provide a searchable function allowing you to view multiple diagrams using readily available pdf viewers. The digital copy of the wiring schematics shall be compatible with hand held devices such as I-Pads.