

CITY OF ZION

FIRE RESCUE DEPARTMENT



SPECIFICATIONS FOR A FIRE ENGINE

BIDS DUE NO LATER THAN 1 P.M. CST TO ZION CITY HALL ON AUGUST 23, 2017

In the event a clarification is requested on the content or context of any part of this specification, the question shall be addressed in email to:

Lieutenant Rocco Campanella

Zion Fire/Rescue Department

Email – rockyc@zion.il.us

(847) 746-4036

(847) 746-4035 fax

When a Bidder requests clarification, an immediate response can be assured. In fairness to all Bidders, a copy of the request and the ZFRD reply will be forwarded to all participating Bidders who have requested specifications from the City Clerk. To ensure that each Bidder has actually received their copy, it would be prudent of the Bidder to contact Lieutenant Campanella at various intervals of their bid preparation to check if there has been any clarification requests. By signing this document, the Bidder agrees that this Bid is made without any understanding, agreement or connection with any other person, firm or corporations making a bid for the same purpose, and that this bid is in all respects fair and without collusion or fraud.

To insure that this contract is awarded to a Bidder who has the resources to meet the performance and warranty criteria specified herein, the Bidders may not have liens placed on their property, buildings or equipment. This agency most probably will procure credit reports to verify compliance. Bids not meeting this requirement cannot be accepted.

Specification for: Zion Fire and Rescue Apparatus Specifications

**Bidder
Complies**

Yes No

Bid Bond

A bid security in the form of a Bid Bond, cashier's check, or certified check made payable to the Purchaser in the amount of ten percent (10%) of the total bid shall be required. This shall serve as a guarantee which may be forfeited and retained by the Purchaser in lieu of its other legal remedies if a successful bidder's proposal is accepted by the Purchaser and the bidder shall fail to execute and return to the Purchaser the required contract and bonds within ten (10) days after delivery. If a Bid Bond is provided, it shall be issued by a bonding company licensed to bond in this State.

Performance Bond

The successful bidder shall provide a Performance bond in the amount of the total contract price to the Purchaser within ten (10) days of contract award. The bond must be underwritten by the bonding company of the apparatus manufacturer. Bonds submitted by the salesperson or agent shall not be accepted. The validity of the bond will be verified by the Purchaser. The bonding company must be licensed to bond in this state. The performance bond must be submitted by the prime contractor and not a subcontractor. No exception.

Certificate of Insurance

Each bidder shall furnish, with their proposal, a Certificate of Product Liability Insurance for a minimum of ten (10) million dollars. Failure to provide this documentation shall render the proposal non-responsive and the bid shall be rejected. This certificate shall be from the prime builder only. Certificates submitted from various sub-contractors in order to total the ten million dollar minimum will not be acceptable as meeting the requirements of this section.

If one of the major portions of the apparatus (i.e. chassis, aerial, or body) is not designed, fabricated, and assembled by the prime builder, a separate Certificate of Liability Insurance for a minimum of ten (10) million dollars must be provided by each additional contractor.

The Certificate must be made out to the Purchaser and must be original. Submission of a non-original Certificate or a Certificate provided that is not made out to the Purchaser will not meet the requirements of this section.

Delivery

The bidder shall state the time required for delivery of the completed unit on the proposal page. The completed unit shall be delivered to the purchaser with full instructions provided to Fire Department personnel on operation, care and maintenance of apparatus at the purchaser's location.

Specification for: Zion Fire and Rescue Apparatus Specifications

**Bidder
Complies**

Yes No

Exceptions

The following apparatus specifications are considered minimum design and construction standards against which the apparatus will be inspected. It is the intent to receive proposals on equipment/apparatus meeting the attached detailed specifications in their entirety. Any proposals being submitted, without "Full Compliance" with these specifications shall so state on the bid proposal page, followed by a detailed "Letter of Exceptions" listing the areas of non-compliance. The reference must include page number, paragraph, and the exact nature of the exception.

Failure to follow this format, provided for the convenience of the Purchaser, will render the vendor's proposal non-responsive and ineligible for award of contract.

The Purchaser may add the statement "No Exception" to a component or design feature in these specifications. In the interest of fleet conformity or specific performance requirements, the Purchaser will not permit exceptions taken to these item(s). The Purchaser reserves the right to reject any or all bid proposals and purchase the equipment it deems most suitable to its needs. The Purchaser does not, in any way, obligate itself to accept the lowest or any bid. Any bidder taking total exception to the complete specification or a major element will result in immediate rejection of the proposal.

Intent of Specifications

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

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

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

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

Each bidder shall furnish satisfactory evidence of their ability to design, engineer, and construct

Specification for: Zion Fire and Rescue Apparatus Specifications	Bidder Complies	
	Yes	No
<p>the apparatus specified and shall state the location of the factory producing the apparatus. They shall also substantiate they are in a position to render prompt and proper service and to furnish replacement parts for the apparatus.</p> <p>Each bid must be accompanied by a set of detailed contractor's specifications consisting of a detailed description of the apparatus and equipment proposed. All bid proposal specifications must be in the same sequence as the advertised specification for ease of comparison. These specifications shall include size, location, type, and model of all component parts being furnished. Detailed information shall be provided on the materials used to construct all facets of the apparatus body. Any bidder who fails to submit detailed construction specifications, or who photo copies and submits these specifications as their own construction details will be considered non-responsive and shall render their proposal ineligible for award. No exception.</p> <p>Bids will be addressed and submitted in accordance with the instructions provided on the cover sheet. The words "Fire Apparatus Proposal", the date, and bid opening time shall be stated on the front of the bid envelope.</p> <p>It shall be the responsibility of the bidder to assure that their proposal arrives at the location and time indicated. Late proposals, telegrams, facsimile, or telephone bids will not be considered. No exception.</p> <p>All bidders are required to detail the payment terms for apparatus on the bidder's proposal page. Any required prepayments or progress payments must be explained in detail.</p> <p>ISO Compliance</p> <p>The manufacturer shall operate a Quality Management System meeting the requirements of ISO 9001:2000.</p> <p>The International Organization for Standardization (ISO) is a recognized world leader in establishing and maintaining stringent manufacturing standards and values. The manufacturer's certificate of compliance affirms that these principles form the basis for a quality system that unswervingly controls design, manufacture, installation, and service.</p> <p>The manufacturer's quality systems shall consist of, but not be limited to, all written quality procedures (aka QOP) and other procedures referenced within the pages of the manufacturer's Quality Manual, as well as all Work Instructions, Workmanship Standards, and Calibration Administration that directly or indirectly impacts products or processes. In addition, all apparatus assembly processes shall be documented for traceability and reference. The manufacturer shall also engage the services of a certified third party for testing purposes where required.</p> <p>If the manufacturer operates more than one manufacturing facility each facility must be ISO certified.</p> <p>By virtue of its ISO compliance the manufacturer shall provide an apparatus that is built to exacting standards, meets the customer's expectations, and satisfies the customer's requirements.</p>		

Specification for: Zion Fire and Rescue Apparatus Specifications

**Bidder
Complies**

Yes No

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

Single Source Manufacturing - Pumper

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

Bidder Qualifications

In a conscious effort to maintain local customer and product service the bid proposal **MUST** come from a servicing dealer and **NOT** direct from the manufacturer **NO EXCEPTIONS**.

The bidder shall be licensed in the State of Illinois as an automotive dealer. A copy of the bidder's dealer license certification must be presented with their proposal. **NO EXCEPTIONS**.

The bidder shall have in operation a parts and service facility adequate for actively engaging in the performance of the services specified herein, having at multiple service bays. **NO EXCEPTIONS**. The facility **WILL** be visited and inspected by the purchaser prior to any award. It is desired that the apparatus is sold by a dealer still within the State of Illinois that maintains a service facility that is equipped with a full fire apparatus body repair and paint facility, metal fabrication facility, indoor pump testing facility, major repair facility and a full staffed and equipped parts department. Lastly, the bidder shall provide mobile service by EVT and ASME certified mechanics in dedicated fire apparatus service vehicles. **NO EXCEPTIONS**

The bidder shall be authorized and trained in the sales and service of the proposed apparatus and its major components. **NO EXCEPTIONS**

The bidder shall employ qualified personnel to render prompt, efficient, and quality service.

The apparatus manufacturer shall be a United States owned and operated company and not be affiliated with a non-United States company or holding group. NO EXCEPTIONS

The manufacturer shall have been in operation for a minimum of thirty (30) years in the manufacture of fire apparatus **OPERATING UNDER THE SAME NAME. NO EXCEPTIONS**

The manufacturer shall design and build the entire apparatus (less vendor supplied items such as engines, transmissions, axles etc.). This is to include cab and body in the same factory location. **NO EXCEPTIONS**

The manufacturer shall be a Registered & in current standing ISO 9001:2008 in the design and

Specification for: Zion Fire and Rescue Apparatus Specifications

**Bidder
Complies**

Yes No

manufacture of custom and standard firefighting and emergency response vehicles and apparatus. NO EXCEPTIONS

An inspection of the bidder's facility may be made prior to award of the bid, at which time additional information could be requested to verify the bidder's responsibility.

The bidder shall identify the location of the manufacturing facility and service facilities.

Test Facilities

The apparatus, prior to acceptance, will be required to meet the performance tests of the applicable NFPA Automotive Fire Apparatus Standard. As such, each bidder shall have the facilities to perform these tests at the manufacturing site. These tests shall include, but not be limited to: acceleration, braking and G-loading tests using a fifth wheel device, all specified pump tests, a 20 percent brake hold test, and turn radius tests.

If the manufacturer does not have the facilities to perform any of the above tests, the manufacturer shall contract with an outside agency to have these tests performed on this apparatus. No exceptions shall be allowed on these performance tests.

TESTING COMPLIANCE STANDARD

Hose Bed Capacity

Hosebed hoseload allowance on the apparatus shall be 1200 lbs. (600' of 3" DJ hose, 1000' of 4" LDH, 200' of 2.5" DJ hose)

Overall Height Restriction

The apparatus shall have no overall height restrictions.

Overall Length Restriction

The unit has no overall length restrictions.

NFPA Compliance

The Original Equipment Manufacturer (OEM) supplied components of the apparatus shall be compliant with NFPA 1901, 2016 edition.

Equipment Capacity

Equipment allowance on the apparatus shall be 2500 lbs. This allowance is in addition to the weight of the hoses and ground ladders listed in the shop order as applicable.

**Specification for: Zion Fire and Rescue
Apparatus Specifications**

**Bidder
Complies**

Yes No

BUMPERS

Front Bumper

The vehicle shall be equipped with a one-piece 10" high bumper made from 10 gauge (0.135" nominal) polished stainless steel for corrosion resistance, strength, and long lasting appearance. It shall be mounted directly to the front frame extensions for maximum strength. The bumper shall incorporate two (2) stiffening ribs.

Front Bumper Extension

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

Bumper Gravel Shield

The extended front bumper gravel shield shall be made of 3/16" (.375") aluminum treadplate material.

BUMPER TRAYS

Lid, Bumper Hose Tray

The center bumper tray shall have a diamond plate lid. The lid shall be hinged and shall be secured in the closed position by a latch and held open with a pneumatic shock.

Bumper Tray - Center

A hose tray constructed of 1/8" aluminum shall be recessed into the front bumper extension. The tray shall be located in the center of the bumper and be approximately 12" deep, holding 150' of 1.75" DJ hose.

Flooring Material

Slatted Duradek fiberglass flooring shall be provided in the center bumper tray providing superior drainage and ventilation.

FRAME ASSEMBLY

Frame Assembly

The frame shall consist of two (2) C-channel frame rails with heavy-duty cross-members. Each frame rail shall have the following minimum specifications to minimize frame deflection under load and thereby improve vehicle ride and extend the life of the frame:

Dimensions: 10-1/4" x 3-1/2" x 3/8"

**Specification for: Zion Fire and Rescue
Apparatus Specifications**

**Bidder
Complies**

Yes No

Material: 110,000-psi minimum yield strength, high strength, low alloy steel

Section Modulus: 16.61 cu. in.

Resistance to Bending Moment (RBM): 1,827,045 in. lbs.

If larger rails are provided, the maximum height of each frame rail shall not exceed the 10-1/4" dimension by more than 1/2" to ensure the lowest possible body height for ease of access as well as the lowest possible vehicle center of gravity for maximum stability.

There shall be a minimum of six (6) cross-members joining the two (2) frame rails to make the frame rigid and hold the rails/liners in alignment. The cross-members shall be a combination of a formed steel C-channel design along with heavy duty steel fabricated designs as required for the exact chassis configuration. The cross-members shall be attached to the frame rails with not less than four (4) bolts at each end arranged in a bolt pattern to adequately distribute the cross-member load into the rail/liner and minimize stress concentrations.

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

The frame rails shall be zinc plated (galvanized) and powder coated for improved corrosion resistance. The galvanization shall be a minimum of 4 mils thick and done in accordance with ASTM A123. The powder coat shall be 6.5 mils thick (+/- 1.5 mils) and pass ASTM D3359 testing.

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

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

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

Specification for: Zion Fire and Rescue Apparatus Specifications

**Bidder
Complies**

Yes No

AXLE OPTIONS

Front Shock Absorbers

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

Rear Axle

The vehicle shall be equipped with an ArvinMeritor RS-25-160 single rear axle with single-reduction hypoid gearing and a manufacturer's rated capacity of 27,000 lbs. The axle shall be equipped with oil-lubricated wheel bearings with ArvinMeritor oil seals.

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

A 2-year/unlimited miles' parts and 2-year labor rear axle warranty shall be provided as standard by ArvinMeritor Automotive.

Front Axle

The vehicle shall utilize an ArvinMeritor FL-941 front axle with a rated capacity of 18,000 lbs. It shall have "easy steer" knuckle pin bushings and 68.5" kingpin centers. The axle shall be of I-beam construction and utilize grease-lubricated wheel bearings. The vehicle shall have a nominal cramp angle of 45 degrees, plus two (+ 2) degrees to minus three (- 3) degrees including front suction applications.

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

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

Tapered leaf springs provide a 20% ride improvement over standard straight spring systems. Supporting documentation/data shall be provided upon request.

The vehicle shall be equipped with a Sheppard model M-110 integral power steering gear. The steering assembly shall be rated to statically steer a maximum front axle load of 18,000 lbs. Relief stops shall be provided to reduce system pressure upon full wheel cut. The system shall operate mechanically should the hydraulic system fail.

A 2-year/unlimited miles' parts and 2-year labor axle warranty shall be provided as standard by ArvinMeritor Automotive.

Specification for: Zion Fire and Rescue Apparatus Specifications	Bidder Complies	
	Yes	No
<p>To achieve maximum vehicle road performance and to promote long tire life, there shall be a wheel alignment. The alignment shall conform to the manufacturer's internal specifications. All wheel lug nuts and axle U-bolt retainer nuts shall be tightened to the proper torque at the time of alignment. The wheel alignment documentation shall be made available at delivery.</p> <p>SUSPENSIONS</p> <p>Rear Suspension</p> <p>The rear suspension shall be a pair of linear-rate leaf springs with auxiliary "helper" leaf springs and bronze bushings. The variable-rate springs with auxiliary springs ensure that the vehicle rides and handles smoothly under both loaded and unloaded conditions. The suspension shall be rated for the maximum axle capacity.</p> <p>WHEEL OPTIONS</p> <p>Front Wheels</p> <p>The vehicle shall have two (2) polished (on outer wheel surfaces only) Alcoa aluminum disc wheels. They shall be forged from one-piece corrosion-resistant aluminum alloy and sized appropriately for the tires.</p> <p>Front Wheel Trim Package</p> <p>The front wheels shall have stainless steel lug nut covers (for use with aluminum wheels) or chrome plated plastic (for use with steel wheels). The front axle shall be covered with American made Real Wheels brand mirror finish, 304L grade, non-corrosive stainless steel universal baby moons. All stainless-steel baby moons shall carry a lifetime warranty plus a 2 year re-buffing policy. There shall be two (2) baby moons and twenty (20) lug nut covers.</p> <p>Rear Wheels</p> <p>The vehicle shall have two (2) polished (on outer wheel surfaces only) Alcoa aluminum disc wheels. They shall be forged from one-piece corrosion-resistant aluminum alloy and sized appropriately for the tires. The Alcoa aluminum wheels shall be mounted in the outboard position.</p> <p>There shall be two (2) hub-piloted steel disc wheels sized appropriately for the tires, located inboard of the aluminum wheels.</p>		

**Specification for: Zion Fire and Rescue
Apparatus Specifications**

**Bidder
Complies**

Yes No

Rear Wheel Trim Package, Single Axle

The rear wheels shall have stainless steel lug nut covers (chrome plated steel lug nut covers not acceptable), or American made chrome plated plastic lug nut covers. The rear axle shall be covered with American made Real Wheels brand mirror finish, 304L grade, non-corrosive stainless steel, spring clip band mount high hats, DOT user friendly. All stainless steel high hats shall carry a lifetime warranty plus a 2-year re-buffing policy. There shall be two (2) high hats and twenty (20) lug nut covers.

TIRE OPTIONS

Front Tires

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

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

18,000 lbs. @ 75 MPH. (Intermittent fire service max load 19,452 lbs.)

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

Rear Tires

The rear tires shall be Michelin 12R22.5 tubeless type radial tires with XDN2 all weather tread.

The tires with wheels shall have the following weight capacity:

27,000 lbs. (dual) @ 75 MPH

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

Tire Pressure Indicators

The apparatus shall be provided with Real Wheels AirGuard LED tire pressure indicating valve stem caps. When the tire is under inflated by 5-10 PSI, the LED indicator on the cap shall flash red. The indicator housings shall be shock resistant and constructed from polished stainless steel. The indicators shall be calibrated by attaching to valve stem of a tire at proper air pressure per load ratings and easily re-calibrated by simply removing and re-installing them during service.

Real Wheel Part number RWC1234 was superseded by RWC1235 as of June 2015

Valve Stem Extensions

The inside dual wheels shall have valve stem extensions.

**Specification for: Zion Fire and Rescue
Apparatus Specifications**

**Bidder
Complies**

Yes No

BRAKE SYSTEMS

Front Brakes

The front axle shall be equipped with Meritor DiscPlus EX225H 17-inch disc brakes.

The brakes shall be covered by the manufacturer's standard warranty which is three years, unlimited mileage and parts only.

Rear Brakes

The rear axle shall be equipped with ArvinMeritor 16-1/2" x 7" S-cam brakes with cast brake drums. Q-Plus shoes shall be provided with up to 24,000 lb. axle ratings and P-Type shoes with over 24,000 lb. axle ratings.

The rear axle brakes shall be furnished with automatic slack adjusters. ArvinMeritor brand shall be supplied on RS-24-160 and RS-25-160 axles, and Haldex brand shall be supplied on RS-26-185 and RS-30-185 axles.

A 3 year/unlimited miles' parts and 3-year labor rear brake warranty shall be provided as standard by ArvinMeritor Automotive. The warranty shall include bushings, seals, and cams.

Brake System

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

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

A pressure-protection valve shall be installed to prevent use of the air horns or other air-operated devices should the air system pressure drop below 85 psi. This feature is designed to prevent inadvertent actuation of the emergency/parking brakes while the vehicle is in motion.

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

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

**Specification for: Zion Fire and Rescue
Apparatus Specifications**

**Bidder
Complies**

Yes No

Tank Capacities in Cubic Inches:

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

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

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

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

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

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

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

A 3 year/300,000 mile parts and labor Anti-Locking Braking System (ABS) warranty shall be provided as standard by Meritor Automotive.

Park Brake Release

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

Specification for: Zion Fire and Rescue Apparatus Specifications

**Bidder
Complies**

Yes No

AIR SYSTEM OPTIONS

Air Dryer

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

Air Inlet

A 1/4" brass quick-release air inlet with a male connection shall be provided. The inlet shall allow a shoreline air hose to be connected to the vehicle, discharging air directly into the wet tank of the air brake system. It shall be located driver door jamb.

Air Lines

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

Air Horns

Dual air horns shall be provided, connected to the chassis air system. The horns shall be mounted through the front bumper. The front bumper shall have two (2) holes punched to accommodate the air horns. A pressure protection valve shall be installed to prevent the air brake system from being depleted of air pressure.

ENGINES & TRANSMISSIONS

Transmission Selector

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

Transmission Fluid

The transmission fluid shall be TransSynd synthetic.

Vehicle Speed

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

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

Specification for: Zion Fire and Rescue Apparatus Specifications

**Bidder
Complies**

Yes No

Engine/Transmission Package

Engine

The vehicle shall utilize a Cummins ISL electronic engine as described below:

- 450 gross bhp at 2200 rpm
- 1250 lb.-ft. peak torque at 1400 rpm
- Six (6)-cylinder, charge air cooled, 4-cycle diesel
- 543 cu. in. displacement -- 4.49 in bore x 5.69 in stroke (8.9 liters)
- 16.6:1 compression ratio
- Interact System Controlled Viable Geometry Turbocharged
- Engine shall be equipped with Full-Authority Electronics
- Electronic Timing Control fuel system
- Fuel cooler (when equipped with a fire pump)
- Fleetguard FS1022 fuel filter with integral water separator and water-in-fuel sensor approved by Cummins for use on the ISL engine
- Fleetguard LF9009 Venturi Combo combination full-flow/by-pass oil filter approved by Cummins for use on the ISL engine
- Engine lubrication system, including filter, shall have a minimum capacity of 25 quarts
- Delco-Remy 39 MT-HD 12-volt starter
- Cummins 18.7 cubic foot per minute (cfm) air compressor
- Corrosion inhibitor additive for coolant system
- After treatment system consisting of an oxidation catalyst and diesel particulate filter and selective catalyst reduction system
- Ember separator compliant with current NFPA 1901 standard
- The engine shall be compliant with 2016 EPA Emission standards
- Reference curve FR93434EV for ISCAAN

The engine air intake shall draw air through the front cab grill. The intake opening shall be located on the officer (right) side behind front cab face with a plenum that directs air to the air filter. The air cleaner intake piping shall be made from aluminized steel tubing with flexible rubber hoses. The intake piping clamps shall be heavy-duty, constant-torque, T-bolt style to ensure proper sealing under all temperatures to keep dust and other contaminants out of the engine intake air stream and protect the engine.

The air cleaner shall be an 11" diameter K&N for lower restriction and high air flow. The filtration media shall be washable and easily accessed for service. The air filter shall have a 3 year / 300,000-mile warranty.

The engine exhaust piping shall be a minimum of 4" diameter welded aluminized steel tubing. The muffler shall be mounted horizontally under the right-hand frame rail behind the cab in order to minimize heat transmission to the cab and its occupants. The exhaust shall be directed away from the vehicle on the right side

Specification for: Zion Fire and Rescue Apparatus Specifications		Bidder Complies	
		Yes	No
<p>ahead of the rear wheels to keep exhaust fumes as far away as possible from the cab and pump operator position.</p> <p>A 5-year/100,000-miles parts and labor warranty shall be provided as standard by Cummins.</p> <p>A copy of the Engine Installation Review stating the engine installation meets Cummins recommendations shall be provided as requested. The engine installation shall not require the operation of any type of "power-down" feature to meet engine installation tests.</p> <p>Transmission</p> <p>The vehicle shall utilize an Allison EVS3000P, electronic, 5-speed automatic transmission.</p> <p>A push button shift module shall be located right side of the steering column, within easy reach of the driver. The shift position indicator shall be indirectly lit for after-dark operation. The shift module shall have a "Do Not Shift" light and a "Service" indicator light that are clearly visible to the driver. The shift module shall have means to enter a diagnostic mode and display diagnostic data.</p> <p>A transmission oil temperature gauge with warning light and buzzer shall be installed on the cab instrument panel to warn the driver of high oil temperatures that may damage the transmission.</p> <p>The transmission shall have a gross input torque rating of 1250 lb.-ft. and a gross input power rating of 450 HP.</p> <p>The gear ratios shall be as follows:</p> <p>1 - 3.49</p> <p>2 - 1.86</p> <p>3 - 1.41</p> <p>4 - 1.00</p> <p>5 - .75</p> <p>R - 5.03</p> <p>The transmission shall have an oil capacity of 23 quarts and shall be equipped with a fluid level sensor (FLS) system, providing direct feedback of transmission oil level information to the driver.</p>			

Specification for: Zion Fire and Rescue
Apparatus Specifications

**Bidder
Complies**

Yes No

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

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

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

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

Automatic Shift to Neutral

The transmission shall be programmed to comply with NFPA 1901 and automatically shift to neutral upon application of the parking brake.

SECONDARY BRAKING

Jacobs Engine Brake

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

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

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

Specification for: Zion Fire and Rescue Apparatus Specifications

**Bidder
Complies**

Yes No

Transmission Programming

The transmission shall include the Allison 2nd gear Pre-Select feature. This option will direct the transmission to down shift to second gear when the throttle is released and the Jacobs engine brake (or Telmaretarder wired to activate with release of throttle) is engaged. This feature is designed to increase brake life and aid vehicle braking.

EXHAUST OPTIONS

Exhaust End Modification

The end of the exhaust tail pipe shall be modified to accommodate a Plymovent in-house exhaust extraction system. The tail pipe will be at 90 degrees and straight out below the side of body. A stop ring shall be provided on the tail pipe to properly position the Plymovent nozzle. The exhaust outlet shall be vented for use with 2013 and newer EPA engines.

COOLING PACKAGE

Engine Cooling Package

Radiator

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

Silicone Hoses

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

Coolant

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

Specification for: Zion Fire and Rescue Apparatus Specifications	Bidder Complies	
	Yes	No
<p>Coolant Recovery</p> <p>There shall be a coolant overflow recovery system provided.</p> <p>Charge Air Cooler System</p> <p>The system shall include a charge air cooler to ensure adequate cooling of the turbocharged air for proper engine operation and maximum performance.</p> <p>Charge Air Cooler Hoses</p> <p>Charge air cooler hoses shall be made from high-temperature, wire-reinforced silicone to withstand the extremely elevated temperatures and pressures of the turbocharged air. The hoses shall incorporate a flexible hump section to allow motion and misalignment of the engine relative to the charge air cooler. Charge air cooler hose clamps shall be heavy-duty, constant-torque, T-bolt clamps to ensure proper sealing under all temperatures to keep dust and other contaminants out of the engine intake air stream and protect the engine.</p> <p>Fan/Shroud</p> <p>The fan shall be 30" in diameter with eleven (11) blades for maximum airflow and dynamic balance. It shall be made of nylon for strength and corrosion resistance. The fan shall be installed with grade 8 hardware which has been treated with thread locker for additional security. A fan shroud attached to the radiator shall be provided to prevent recirculation of engine compartment air around the fan to maximize the cooling airflow through the radiator. The fan shroud shall be constructed of fiber-reinforced elevated temperature plastic. The shroud shall be specifically formed with curved surfaces which improves air flow and cooling.</p> <p>Transmission Cooler</p> <p>The cooling system shall include a liquid-to-liquid transmission cooler capable of cooling the heat generated from the transmission. When a transmission retarder is selected, the cooler shall have an increased capacity to handle the additional heat load.</p> <p>FUEL SYSTEMS</p> <p>Fuel System</p> <p>One (1) 50-gallon fuel tank shall be provided. The tank shall be of an all-welded, aluminized-steel construction with anti-surge baffles and shall conform to all applicable Federal Highway Administration (FHWA) 393.65 and 393.67 standards. The tank shall be mounted below the frame rails at the rear of the chassis for</p>		

Specification for: Zion Fire and Rescue Apparatus Specifications	Bidder Complies	
	Yes	No
<p>maximum protection. The tank shall be secured with two (2) wrap-around T-bolt type stainless steel straps. Each strap shall be fitted with protective rubber insulation and shall be secured with grade 8 hardware. This design allows for tank removal from below the chassis.</p> <p>The fuel tank shall be equipped with a 2" diameter filler neck. The filler neck shall extend to the rear of the vehicle behind the rear tires and away from the heat of the exhaust system as required by NFPA 1901 Standard for Automotive Fire Apparatus. The open end of the filler neck shall be equipped with a twist-off filler cap with a retaining chain.</p> <p>The tank shall be plumbed with top-draw and top-return fuel lines in order to protect the lines from road debris. Bottom-draw and/or bottom-return fuel lines are not acceptable. A vent shall be provided at the top of the tank. The vent shall be connected to the filler neck to prevent splash-back during fueling operations. A .50" NPT drain plug shall be provided at the bottom of the tank.</p> <p>The tank shall have a minimum useable capacity of 50 gallons of fuel with a sufficient additional volume to allow for thermal expansion of the fuel without overflowing the vent.</p> <p>A mechanical fuel pump shall be provided and sized by the engine manufacturer as part of the engine.</p> <p>Fuel Line</p> <p>All fuel lines shall be rubber.</p> <p>ALTERNATOR</p> <p>320 Amp Alternator</p> <p>There shall be a 320 amp Leece Neville alternator installed as specified. The alternator shall be a Leece Neville 4890JB series brushless type with integral rectifier and adjustable voltage regulator with an output of 275 amps per NFPA 1901 rating (320 amps per SAE J56).</p> <p>BATTERIES</p> <p>Battery System</p> <p>The manufacturer shall supply four (4) heavy duty Group 31 12-volt maintenance-free batteries. Each battery shall be installed and positioned to allow easy replacement of any single battery. Each battery shall be equipped with carrying handles to facilitate ease of removal and replacement. There shall be two (2) steel frame mounted battery boxes, one (1) on the left frame rail and one (1) on the right frame rail. Each battery box shall be secured to the frame rail with Grade 8 hardware. Each battery box shall hold (2) batteries. The batteries shall have a minimum</p>		

Specification for: Zion Fire and Rescue Apparatus Specifications	Bidder Complies	
	Yes	No
<p>combined rating of 4,000 (4 x 1000) cold cranking amps (CCA) @ 0 degrees Fahrenheit and 820 (4 x 205) minutes of reserve capacity for extended operation. The batteries shall have 3/8-16 threaded stud terminals to ensure tight cable connections. The battery stud terminals shall each be treated with concentrated industrial soft-seal after cable installation to promote corrosion prevention. The positive and negative battery stud terminals and the respective cables shall be clearly marked to ensure quick and mistake-proof identification.</p> <p>Batteries shall be placed on non-corrosive rubber matting and secured with hold-down brackets to prevent movement, vibration, and road shock. The hold-down bracket J-hooks shall be cut to fit and shall have all sharp edges removed. The batteries shall be placed in plastic trays to provide preliminary containment should there be leakage of hazardous battery fluids. There shall be two (2) plastic trays, each containing (2) batteries. Each battery tray shall be equipped with a rubber vent hose to facilitate drainage. The rubber vent hose shall be routed to drain beneath the battery box. The batteries shall be positioned in well-ventilated areas.</p> <p>One (1) positive and one (1) negative jumper stud shall be provided.</p> <p>Batteries shall have a warranty of twelve (12) months that shall commence upon the date of delivery of the apparatus.</p> <p>CHASSIS OPTIONS</p> <p>Engine Fan Clutch</p> <p>The engine shall be equipped with a thermostatically controlled engine cooling fan. The fan shall be belt driven and utilize a clutch to engage when the engine reaches a specified temperature and/or the water pump is engaged (if equipped).</p> <p>When disengaged, the fan clutch shall allow for improved performance from optional floor heaters, reduced cab interior noise, increased acceleration and improved fuel economy.</p> <p>The fan shall be equipped with a fail-safe engagement so that if the clutch fails the fan shall engage to prevent engine overheating.</p> <p>Drivelines</p> <p>Drivelines shall have a heavy-duty metal tube and shall be equipped with Spicer 1710HD universal joints to allow full-transmitted torque to the axle(s). Drive shafts shall be axially straight, concentric with axis and dynamically balanced.</p> <p>Front Tow Eyes</p> <p>Two (2) 3/4" thick heavy duty steel tow eyes shall be securely attached to the chassis frame rails at the front of the apparatus. They shall be mounted down below the bumper/cab.</p>		

Specification for: Zion Fire and Rescue Apparatus Specifications

**Bidder
Complies**

Yes No

Rear Tow Eyes

Two (2) heavy duty tow eyes made of 3/4" (0.75") thick steel having 2-1/2" diameter holes shall be mounted below the body at the rear of the vehicle to allow towing (not lifting) of the apparatus without damage. The tow eyes will be welded to the lower end of a 5" steel channel that is bolted at the end of the chassis frame rails. The tow eyes shall be painted chassis black.

DEF Tank

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

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

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

The tank shall be located left side below rear of cab.

Power Steering Cooler

A heat exchanger (cooler) shall be installed to maintain desired power steering fluid temperature. The cooler shall be a model DH-073-1-1 with air / oil design rated at 6300 BTU/HR @10 GPM. The cooler shall be mounted in front of the radiator and plumbed with #10 lines.

Chassis Auto Lube System

A chassis auto lube system shall be installed. The system shall be a Robert Shall Auto Lube system. The system shall be made in America, with all parts American made.

CAB MODEL

Heavy Duty, Single Source Cab, Medium Length

The vehicle shall be distinguished by an all-welded aluminum and fully enclosed tilt cab. The cab shall be designed exclusively for fire/rescue service and shall be pre-engineered to ensure long life. It shall incorporate an integral welded substructure of high-strength aluminum alloy extrusions that creates an occupant compartment that is essentially a protective perimeter. The result is a distinctive structure that is

Specification for: Zion Fire and Rescue
Apparatus Specifications

**Bidder
Complies**

Yes No

aesthetically appealing, functionally durable, and characterized by increased personnel safety.

The cab shall be constructed from a minimum of 3/16" (0.188") 3003 H14 aluminum alloy plate roof, floor, and outer skins welded to a high-strength 6063-T6 aluminum alloy extruded subframe. Wall supports and roof bows are 6061 T6 aluminum alloy. This combination of a high-strength, welded aluminum inner structure surrounded by load-bearing, welded aluminum outer skins provides a cab that is strong, lightweight, corrosion-resistant, and durable.

The inner structure shall be designed to create an interlocking internal "roll-cage" effect by welding minimum of two (2) 3" x 3" x 0.188" wall-thickness 6063-T5 aluminum upright extrusions between the 3" x 3" x 0.375" wall-thickness 6061-T6 roof crossbeam and the 2.25" x 3" x 0.435" wall-thickness 6063-T6 subframe structure in the front. An additional two (2) aluminum upright extrusions within the back-of-cab structure shall be welded between the rear roof perimeter extrusion and the subframe structure in the rear to complete the interlocking framework. The four (4) upright extrusions -- two (2) in the front and two (2) in the rear -- shall be designed to effectively transmit roof loads downward into the subframe structure to help protect the occupant compartment from crushing in a serious accident. All joints shall be electrically seam welded internally using aluminum alloy welding wire.

The subframe structure shall be constructed from minimum of high-strength 6061-T6 aluminum extrusions welded together to provide a structural base for the cab. It shall include a side-to-side 3" x 1.5" .375 thick C-channel extrusion across the front, with 3/4" x 2-3/4" (.75" x 2.75") full-width crossmember tubes spaced at critical points between the front and rear of the cab.

The cab floor shall be constructed from minimum of 3/16" (0.188") 3003 H14 smooth aluminum plate welded to the subframe structure to give the cab additional strength and to help protect the occupants from penetration by road debris and under-ride collision impacts.

The cab roof shall be constructed from minimum of 3/16" (0.188") 3003 H14 aluminum treadplate supported by a grid of fore-aft and side-to-side aluminum extrusions to help protect the occupants from penetration by falling debris and downward-projecting objects. Molded fiberglass or other molded fiber-reinforced plastic roof materials are not acceptable.

The cab roof perimeter shall be constructed from minimum of 4" x 6-5/8" (4" x 6.625") 6063-T5 aluminum extrusions with integral drip rails. Cast aluminum corner joints shall be welded to the aluminum roof perimeter extrusions to ensure structural integrity. The roof perimeter shall be continuously welded to the cab roof plate to ensure a leak-free roof structure.

Specification for: Zion Fire and Rescue Apparatus Specifications	Bidder Complies	
	Yes	No
<p>The cab rear skin shall be constructed from minimum of 3/16" (0.188") 3003 H14 aluminum plate. Structural extrusions shall be used to reinforce the rear wall.</p> <p>The left-hand and right-hand cab side skins shall be constructed from minimum of 3/16" (0.188") 3003 H14 smooth aluminum plate. The skins shall be welded to structural aluminum extrusions at the top, bottom, and sides for additional reinforcement.</p> <p>The cab front skins shall be constructed from minimum of 3/16" (0.188") 3003 H14 smooth aluminum plate. The upper portion shall form the windshield mask, and the lower portion shall form the cab front. Each front corner shall have a full 9" outer radius for strength and appearance. The left-hand and right-hand sides of the windshield mask shall be welded to the left-hand and right-hand front door frames, and the upper edge of the windshield mask shall be welded to the cab roof perimeter extrusion for reinforcement. The cab front shall be welded to the subframe C-channel extrusion below the line of the headlights to provide protection against frontal impact.</p> <p>Cab Exterior</p> <p>The exterior of the cab shall be a minimum of 94" wide x 130" long to allow sufficient room in the occupant compartment for up to four (4) fire fighters. The cab roof shall be approximately 101" above the ground with the flat roof option. The back-of-cab to front axle length shall be a minimum of 58".</p> <p>Front axle fenderette trim shall be brushed aluminum for appearance and corrosion resistance. Bolt-in front wheel well liners shall be constructed of 3/16" (0.188") composite material to provide a maintenance-free, damage-resistant surface that helps protect the underside of the cab structure and components from stones and road debris.</p> <p>The cab windshield shall be of a two-piece replaceable design for lowered cost of repair. The windshield shall be made from 1/4" (0.25") thick curved, laminated safety glass with a 75% light transmittance automotive tint. A combined minimum viewing area of 2,700-sq. in. shall be provided. Forward visibility to the ground for the average (50th percentile) male sitting in the driver's seat shall be no more than 11 feet 7 inches from the front of the cab to ensure good visibility in congested areas.</p> <p>Cab Mounts and Cab Tilt System</p> <p>The cab shall be independently mounted from the body and chassis to isolate the cab structure from stresses caused by chassis twisting and body movements. Mounting points shall consist of two (2) forward-pivoting points, one (1) on each side; two (2) intermediate rubber load-bearing cushions located midway along the length of the cab, one on each side; and two (2) combination rubber shock mounts and cab latches located at the rear of the cab, one (1) on each side.</p>		

Specification for: Zion Fire and Rescue Apparatus Specifications	Bidder Complies	
	Yes	No
<p>An electric-over-hydraulic cab tilt system shall be provided to provide easy access to the engine. It shall consist of two (2) large-diameter, telescoping, hydraulic lift cylinders, one (1) on each side of the cab, with a frame-mounted electric-over-hydraulic pump for cylinder actuation.</p> <p>Safety flow fuses (velocity fuses) shall be provided in the hydraulic lift cylinders to prevent the raised cab from suddenly dropping in case of a burst hydraulic hose or other hydraulic failure. The safety flow fuses shall operate when the cab is in any position, not just the fully raised position.</p> <p>The hydraulic pump shall have a manual override system as a backup in the event of an electrical failure. Lift controls shall be located in a compartment to the rear of the cab on the right side of the apparatus. A parking brake interlock shall be provided as a safety feature to prevent the cab from being tilted unless the parking break is set.</p> <p>The entire cab shall be tilted through a 42-45 degree arc to allow for easy maintenance of the engine, transmission and engine components. A positive-engagement safety latch shall be provided to lock the cab in the full tilt position to provide additional safety for personnel working under the raised cab.</p> <p>In the lowered position, the cab shall be locked down by two (2) automatic, spring-loaded cab latches at the rear of the cab. A "cab ajar" indicator light shall be provided on the instrument panel to warn the driver when the cab is not completely locked into the lowered position.</p> <p>Cab Interior</p> <p>The interior of the cab shall be of the open design with an ergonomically-designed driver area that provides ready access to all controls as well as a clear view of critical instrumentation.</p> <p>The engine cover between the driver and the officer shall be a low-rise contoured design to provide sufficient seating and elbow room for the driver and the officer. The engine cover shall blend in smoothly with the interior dash and flooring of the cab. An all-aluminum subframe shall be provided for the engine cover for strength. The overall height of the engine enclosure shall not exceed 23" from the floor at each side and 27" in the center section. The engine cover shall not exceed 41" in width at its widest point.</p> <p>The rear portion of the engine cover shall be provided with a lift-up section to provide easy access for checking transmission fluid, power steering fluid, and engine oil without raising the cab. The engine cover insulation shall consist of 3/4" dual density fiberglass composite panels with foil backing manufactured to specifically fit the engine cover without modification to eliminate "sagging" as found with foam insulation. The insulation shall meet or exceed DOT standard MVSS 302-1 and V-0 (UI subject 94 Test).</p>		

Specification for: Zion Fire and Rescue

Apparatus Specifications

**Bidder
Complies**

Yes No

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

The rear engine cover area shall be covered with molded 18 lb./cu. ft. (+/-0.5) flexible integral skinned polyurethane foam that's covered in a bed liner material, at a Durometer of 60 (+/- 5.0) per ASTM F1957-99. The cover shall be approximately .5" thick with a minimum skin thickness of 0.0625 inches. The cover shall be provided to reduce the transmission of noise and heat from the engine. The cover shall be black with a pebble grain finish for slip resistance.

A minimum of 57.25" of floor-to-ceiling height shall be provided in the front seating area of the cab and a minimum of 55.25" floor-to-ceiling height shall be provided in the rear seating area. A minimum of 36" of seated headroom at the "H" point shall be provided over each fender well.

The interior side to side dimensions shall be a minimum of 87" from wall padding to wall padding and 89.5" from door to door.

The floor area in front of the front seat pedestals shall be no less than 24" side to side by up to 25.0" front to rear for the driver and no less than 24" side to side by up to 27.0" front to rear for the officer to provide adequate legroom.

Battery jumper studs shall be provided to allow jump-starting of the apparatus without having to tilt the cab.

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

The interior of the cab shall be insulated to ensure the sound (dbA) level for the cab interior is within the limits stated in the current edition of NFPA 1901. The insulation shall consist of 2 oz. wadding and 1/4" (0.25") foam padding. The padding board shall be backed with 1/4" (0.25") thick reflective insulation. The backing shall be spun-woven polyester. Interior cab padding shall consist of a rear cab headliner, a rear wall panel, and side panels between the front and rear cab doors.

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

Storage areas, with hinged access doors, shall be provided below the driver and officer seats. The driver side compartment shall be approximately 19.25" x 17.75" x 5.75" high and the officer side compartment shall be approximately 18.25" x 22.5" x 11" high (19.25" x 17.75" x 5.75" w/ air ride).

The front cab steps shall be a minimum of 8" deep x 24" wide. The first step shall be no more than 24.0" above the ground with standard tires in the unloaded condition

Specification for: Zion Fire and Rescue Apparatus Specifications	Bidder Complies	
	Yes	No
<p>per NFPA 1901 standards. The rear cab steps shall be a minimum 12" deep x 21" wide. The first step shall be no more than 24.0" above the ground with standard tires in the unloaded condition per NFPA 1901 standards. The rear steps shall incorporate intermediate steps for easy access to the cab. The steps are to be located inside the doorsill, where they are protected against mud, snow, ice, and weather. The step surfaces shall be aluminum diamond plate with a multi-directional, aggressive gripping surface incorporated into the aluminum diamond plate in accordance with current NFPA 1901.</p> <p>A black grip handle shall be provided on the interior of each front door below the door window to ensure proper hand holds while entering and exiting the cab. An additional black grip handle shall be provided on the left and right side windshield post for additional handholds.</p> <p>Cab Doors</p> <p>There shall be reflective signs on each cab door in compliance with all NFPA requirements.</p> <p>Four (4) side-opening cab doors shall be provided. Doors shall be constructed of a minimum of 3/16" (0.188") aluminum plate outer material with an aluminum extruded inner framework to provide a structure that is as strong as the side skins.</p> <p>Front cab door openings shall be approximately a minimum of 36" wide x 71.5" high, and the rear cab door openings shall be approximately 33.75" wide x 73" high. The front doors shall open approximately 75 degrees, and the rear doors shall open approximately 80 degrees.</p> <p>The doors shall be securely fastened to the doorframes with full-length, stainless steel piano hinges, with 3/8" (0.375") diameter pins for proper door alignment, long life, and corrosion resistance. Mounting hardware shall be treated with corrosion-resistant material prior to installation. For effective sealing, an extruded rubber gasket shall be provided around the entire perimeter of all doors.</p> <p>Stainless steel paddle-style door latches shall be provided on the interiors of the doors. The latches shall be designed and installed to protect against accidental or inadvertent opening as required by NFPA 1901.</p> <p>The front door windows shall provide a minimum viewing area of 530 sq. in. each. The rear door windows shall provide a minimum viewing area of 500 sq. in. each. All windows shall have 75% light transmittance automotive safety tint. Full roll-down windows shall be provided for the front cab doors with worm gear drive cable operation for positive operation and long life. Scissors or gear-and-sector drives are not acceptable.</p>		

Specification for: Zion Fire and Rescue Apparatus Specifications

**Bidder
Complies**

Yes No

Cab Instruments and Controls

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

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

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

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

Fast Idle System

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

Electrical System

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

Specification for: Zion Fire and Rescue

Apparatus Specifications

**Bidder
Complies**

Yes No

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

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

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

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

Two (2) dual rectangular chrome plated headlight bezels shall be installed on the front of the cab. The low beam headlights shall activate with the release of the parking brake to provide daytime running lights (DRL) for additional vehicle conspicuity and safety. The headlight switch shall automatically override the DRL for normal low beam/high beam operation.

Cab Crashworthiness Requirement

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

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

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

Cab testing shall be completed using 13,776 ft.-lbs. of force **exceeding** testing requirements.

Specification for: Zion Fire and Rescue Apparatus Specifications	Bidder Complies	
	Yes	No
<p>Quasi-static Roof Strength (proof loads) per SAE J2422 (Section 6) / ECE R29, Annex 3, paragraph 5.</p> <p>Testing shall meet and/or exceed defined test using 22,046 lbs. of mass as a requirement. Testing shall be completed using platen(s) distributed uniformly over all bearing members of the cab roof structure.</p> <p>Cab testing shall be completed using 23,561 lbs. of mass exceeding testing requirements. The cab shall exhibit minimal to no intrusion into the cab's occupant survival space and doors shall remain closed.</p> <p>Additional cab testing shall be conducted using 117,336 lbs. of mass exceeding testing requirements by over five (5) times. The cab shall exhibit minimal to no intrusion into the cab's occupant survival space and the doors shall remain closed.</p> <p>Frontal Impact per SAE J2420.</p> <p>Testing shall meet and/or exceed defined test using 32,549 ft.-lbs. of force as a requirement. The cab shall be subject to a frontal impact as defined by the standard. The cab shall exhibit minimal to no intrusion into the cab's occupant survival space, doors shall remain closed and cab shall remain attached to frame.</p> <p>Cab testing shall be completed using 34,844 ft.-lbs. of force exceeding testing requirements.</p> <p>Additional cab testing shall be conducted using 65,891 ft.-lbs. of force exceeding testing requirements by over two (2) times.</p> <p>The cab shall meet all requirements to the above cab crash worthiness; NO EXCEPTIONS.</p> <p>A copy of a certificate or letter verifying compliance to the above performance by an independent, licensed, professional engineer shall be provided upon request.</p> <p>For any or all the above tests, the cab manufacturer shall provide either photographs or video footage of the procedure upon request.</p> <p>Seat Mounting Strength</p> <p>The cab seat mounting surfaces shall be third party tested and in compliance with FMVSS 571.207.</p> <p>Seat Belt Anchor Strength</p> <p>The cab seat belt mounting points shall be third party tested and in compliance with FMVSS 571.210.</p>		

Specification for: Zion Fire and Rescue Apparatus Specifications		Bidder Complies	
		Yes	No
<p>ISO Compliance</p> <p>The manufacturer shall ensure that the construction of the apparatus cab shall be in conformance with the established ISO-compliant quality system. All written quality procedures and other procedures referenced within the pages of the manufacturer's Quality Manual, as well as all Work Instructions, Workmanship Standards, and Calibration Administration that directly or indirectly impacts this process shall be strictly adhered to. By virtue of its ISO compliance the manufacturer shall provide an apparatus cab that is built to exacting standards, meets the customer's expectations, and satisfies the customer's requirements.</p> <p>CAB ROOF TYPE</p> <p>Raised Roof</p> <p>The rear portion of the cab roof shall be raised 12". This will provide at least 5' 7" standing room. The front of the vista hood shall be sloped at 45 degrees from the vertical. The slope shall begin slightly in front of the centerline of the front axle to leave room for warning lights and air conditioning in front of the vista. The main roof extrusion shall extend up into the vista to strengthen the roof perimeter. Windows shall be provided on front, side, and rear unless otherwise specified.</p> <p>The rear door shall have an 85" vertical dimension for improved ingress/egress characteristics.</p> <p>CAB BADGE PACKAGE</p> <p>Logo Package</p> <p>The apparatus shall have manufacturer logos provided on the cab and body as applicable.</p> <p>GRILLE</p> <p>GRILLE, ABS CHROME</p> <p>The front cooling air intake grille shall be constructed of stainless steel mesh and supported by an impact-resistant chrome plated ABS frame providing no less than 81% open area for excellent cooling performance.</p>			

Specification for: Zion Fire and Rescue Apparatus Specifications	Bidder Complies	
	Yes	No
CAB DOOR OPTIONS		
Rear Cab Door Position <p>The cab rear doors shall be moved to the rear of the wheel opening. This door placement facilitates easier entry and egress by reducing the rear facing seat protrusion into the door opening.</p> <p>Rear door position is preferred to be in the medium position or at 58" (medium cab).</p>		
Cab Front Door Windows <p>Driver and officer door windows shall have the support pillar located toward the front of the window. There shall be a vent that can be opened and closed within the window itself, located towards the front.</p>		
Rear Cab Door Windows <p>The rear cab door windows shall be manually operated to raise and lower.</p>		
Cab Front Windows <p>The front windows of the cab shall have manual actuation.</p>		
Cab Door Locks <p>Each cab door shall have a manual operated door lock actuated from the interior of each respective door. Exterior of each cab door shall be provided with a barrel style keyed lock below the cab door handle.</p>		
Cab Door Locks <p>The cab shall have 1250 keyed door locks provided on exterior doors to secure the apparatus.</p>		
Cab Door Exterior Latches <p>All cab doors shall have "L" style exterior door latches.</p>		
Cab Door Handle Scuff Plates <p>A stainless-steel scuff plate shall be installed at all cab door "L" handles for added paint protection.</p>		
Cab Door Panels <p>The inner door panels shall be made from 1/8" (.125") aluminum plate painted Zolatone gray for increased durability. The cab door panels shall incorporate an easily removable panel for access to the latching mechanism for maintenance or service.</p>		

Specification for: Zion Fire and Rescue Apparatus Specifications

**Bidder
Complies**

Yes No

Cab Door Reflective Material

Reflective chevron Scotchlite striping shall be supplied on each of the cab doors. The stripes shall be angled from the lower outer corner to the upper inside corner, forming an "A" shape when viewed from the rear. The reflective material shall be at least 96 square inches to meet NFPA 1901 requirements.

Cab Door Area Lighting

There shall be four (4) clear TecNiq model T440 4" circular LED lights provided to illuminate the cab step well area. Each light shall be mounted in a resilient shock absorbent grommet and be located on each cab door in the inboard position. Each light shall be activated by the cab door ajar circuit.

MIRRORS

Cab Mirrors

Two (2) Velvac model 2010 heated, remote controlled, stainless steel mirrors shall be installed. The west coast style mirrors shall consist of a large 7" x 16" flat and 4" x 6" wide angle convex with stainless steel break-away mounts. The adjustment of the main sections of the mirror and the heater control shall be through switches accessible to the driver.

MISC EXTERIOR CAB OPTIONS

Cab Canopy Window

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

Window dimensions shall be as follows:

- 44" C/A cab (short cab): 16"W x 24.5"H
- 58" - 80" C/A cab (medium - extended): 26.69"W x 24.5"H

Cab Canopy Window

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

Window dimensions shall be as follows:

- 44" C/A cab (short cab): 16"W x 24.5"H
- 58" - 80" C/A cab (medium - extended): 26.69"W x 24.5"H

Specification for: Zion Fire and Rescue Apparatus Specifications

**Bidder
Complies**

Yes No

Front Mud Flaps

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

Handrails

Cab door assist handrails shall consist of two (2) 1.25" diameter x 18" long 6063-T5 anodized aluminum tubes mounted directly behind the driver and officer door openings one each side of the cab. The handrails shall be machine extruded with integral ribbed surfaces to assure a good grip for personnel safety. Handrails shall be installed between chrome end stanchions and shall be positioned at least 2" from the mounting surface to allow a positive grip with a gloved hand.

Handrails

Cab door assist handrails shall consist of two (2) 1.25" diameter x 36" long 6063-T5 anodized aluminum tubes mounted directly behind the driver and officer rear door openings one each side of the cab. The handrails shall be machine extruded with integral ribbed surfaces to assure a good grip for personnel safety. Handrails shall be installed between chrome end stanchions and shall be positioned at least 2" from the mounting surface to allow a positive grip with a gloved hand.

Rear Cab Wall Construction

The rear cab wall shall be constructed with the use of 3/16" aluminum diamond plate interlocking in aluminum extrusions.

Receptacle Mounting Plate

A mounting plate shall be provided for the battery charger receptacle, battery charger indicator and if applicable the air inlet, etc. The plate shall be constructed of 14 gauge brushed finish stainless steel and be removable for service access to the receptacle(s) and indicator.

HVAC

Air Conditioning

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

The unit shall be mounted to the cab interior headliner in a mid-cab position, away from all seating positions. The unit shall provide ten (10) comfort discharge louvers, four (4) to the back area of the cab and six (6) to the front. These louvers will be used for AC and heat air delivery. Two (2) additional large front louvers shall be

Specification for: Zion Fire and Rescue
Apparatus Specifications

**Bidder
Complies**

Yes No

damper controlled to provide defogging and defrosting capabilities to the front windshield as necessary.

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

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

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

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

AC BTU: 55,000

Heat BTU: 65,000

CFM: 1300 @ 13.8V (All blowers)

The compressor shall be a ten-cylinder swash plate type Seltec model TM-31HD with a capacity of 19.1 cu. in. per revolution.

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

Heat, Supplemental

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

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

Dual climate control will be achieved via dual switches installed on a front instrument panel. On units with optional multiplex display climate control, the floor heaters shall be controlled through the HVAC screen in the display.

HVAC Control Location

Heating and air conditioning controls shall be located in the center dash area upper tier offset to driver side.

**Specification for: Zion Fire and Rescue
Apparatus Specifications**

**Bidder
Complies**

Yes No

SEATS

Seating

All seats shall be Seats, Inc. 911 brand.

Seat, Driver

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

Features shall include:

- Universal styling
- High back seat back
- Low profile air suspension assembly with rubber accordion cover
- Weight, height and ride adjustment
- Built-in back and lumbar adjustment
- 4" fore and aft adjustment

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

Seat, Officer

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

Features shall include:

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

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

Seat, Rear Facing

One (1) Seats, Inc. 911 Universal SCBA seat shall be provided in the rear facing position over the driver side wheel well.

Features shall include:

Specification for: Zion Fire and Rescue Apparatus Specifications

**Bidder
Complies**

Yes No

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

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

Seat, Rear Facing

One (1) Seats, Inc. 911 Universal SCBA seat shall be provided in the rear facing position over the officer side wheel well.

Features shall include:

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

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

Seat Fabric Color

All seats shall be gray in color.

Seating Capacity Tag

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

Universal Bracket for Air Pack Bottles

A Ziamatic bottle bracket model KD-ULLH consisting of a back plate, short footplate, two non-mar double-coated clips and a "Load & Lock" adjustable strap assembly shall be provided. The back plate and footplate will be black thermo-plastic coated. The clips will be double coated as to not mar cylinders. The bracket shall fit all U.S. made 30 to 60 minute rated self-contained breathing apparatus.

Brackets shall be located officer's seat, rear facing driver's side, and rear facing officer's side.

Seat Cover Material

All seats shall have Turnout Tuff seat cover material.

**Specification for: Zion Fire and Rescue
Apparatus Specifications**

**Bidder
Complies**

Yes No

MISC INTERIOR CAB OPTIONS

Cab Interior Color

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

Sun Visors

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

Cab Dash - Severe Duty

The center and officer side dash shall be constructed from .125" smooth aluminum plate painted to match the cab interior. A hinged access panel shall be provided on top of the center dash to provide easy access to components within.

The lower kick panels below the dash to be constructed from .125" aluminum diamond plate. The panels shall be removable to allow for servicing components that may be located behind the panels.

Engine Cover

The engine cover shall blend in smoothly with the interior dash and flooring of the cab. The upper left and right sides shall have a sloped transition surface running front to rear providing increased space for the driver and officer.

The engine cover and engine service access door cover shall be molded 18 lb./cu. ft. (+/-0.5) flexible integral skinned polyurethane foam at a Durometer of 60 (+/- 5.0) per ASTM F1957-99. The cover shall be approximately .5" thick with a minimum skin thickness of 0.0625 inches. The cover shall be provided to reduce the transmission of noise and heat from the engine. The cover shall be black and feature a pebble grain finish for slip resistance.

EMS Compartment

There shall be a medical storage cabinet provided in the cab at the center of the rear cab wall. The medical cabinet shall be constructed of 1/8" smooth aluminum plate and painted to match the interior of the cab. The medical cabinet shall be approximately 64" high x 38" wide x 20" deep interior. Two (2) vertically adjustable shelves shall be provided and installed in the medical cabinet. The shelf shall be constructed of 1/8" smooth aluminum plate. The shelf shall have a 1" front for added strength and reinforcement. The shelf shall be sized to the interior dimensions of the medical cabinet. The shelf shall be mounted with extruded aluminum adjustable shelf tracking attached to the cabinet walls and the shelf to be secured with aluminum

Specification for: Zion Fire and Rescue Apparatus Specifications	Bidder Complies	
	Yes	No
<p>brackets to the tracks to allow for vertical height adjustment. As necessary a .75" x 2-.75" aluminum extrusion shall be mounted to the underside of the shelves to provide additional reinforcement as needed. The compartment shall have LED strip lights that activate by opening or closing of the roll up door. There shall be a forward-facing ROM rollup door provided to secure contents.</p> <p>CAB ELECTRICAL OPTIONS</p> <p>Cab Dome Lights</p> <p>A Weldon LED dome light assembly with one (1) white lens and one (1) red lens and plastic housing shall be installed. The white light activates with appropriate cab door and light assembly switch, the red light activates with light assembly mounted switch only.</p> <p>There shall be two (2) mounted in the front of the cab, one (1) in the driver and one (1) in the officer ceiling.</p> <p>There shall be two (2) mounted in the rear of the cab, one (1) in the driver side and one (1) in the officer side ceiling.</p> <p>Auto-Eject Battery Charger Receptacle</p> <p>The battery charger receptacle shall be a Kussmaul 20 amp NEMA 5-20 Super Auto-Eject #091-55-20-120 with a cover. The Super Auto-Eject receptacle shall be completely sealed and have an automatic power line disconnect.</p> <p>The receptacle shall be located outside driver's door next to handrail and the cover color shall be Yellow.</p> <p>English Dominant Gauge Cluster</p> <p>The cab operational instruments shall be located in the dashboard on the driver side of the cab and shall be clearly visible. The gauges in this panel shall be English dominant and shall be the following:</p> <ul style="list-style-type: none"> • Speedometer/Odometer • Tachometer with integral hour meter • Engine oil pressure gauge with warning light and buzzer • Engine water temperature gauge with warning light and buzzer • Two (2) air pressure gauges with a warning light and buzzer (front air and rear air) • Fuel gauge 		

Specification for: Zion Fire and Rescue Apparatus Specifications

**Bidder
Complies**

Yes No

- Voltmeter
- Transmission oil temperature gauge

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

Cab Turn Signals

There shall be a pair of Whelen 600 LED (Light Emitting Diode) turn signal light heads with populated arrow pattern and amber lens mounted upper headlight bezel and wired with weatherproof connectors.

Headlights

The front of the cab shall have four (4) headlights. The headlights shall be mounted on the front of the cab in the lower position. The headlights shall be day time operational.

The headlights shall have a flasher that is activated with the emergency master and interlocked with the parking brake.

Cab 12 Volt (or 24 Volt) Outlet

A plug-in type receptacle for hand held spotlights, cell phones, chargers, etc. shall be installed officer side dash. The receptacle shall be wired battery hot.

Battery Charger Location

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

Battery Charger

A Kussmaul LPC 20 battery charger with remote mounted LED display shall be installed.

A fully automatic charging system shall be installed on the apparatus. The system shall have a 120 volt, 60 hertz, 7-amp AC input with an output of 20 amps 12 volts DC. The battery charging system shall be connected directly to the shoreline to ensure the batteries remain fully charged while the vehicle is in the fire station or firehouse.

The system shall include a remote charging status indicator panel. The panel shall consist of two (2) LED lights to provide a visual signal if battery voltage is good or drops below 11.5 volts. The microprocessor shall be continuously powered from the battery to provide the charge status.

**Specification for: Zion Fire and Rescue
Apparatus Specifications**

**Bidder
Complies**

Yes No

Cab Headlights

The quad cab headlight bezels shall contain rectangular sealed beam halogen lights.

DPF Regeneration Override

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

BODY

Stainless Steel Body Construction

The compartment floors, front panels, vertical side sheets, rear walls, door openings, wheel wells, compartment panels, dividing walls, and reinforcements shall be constructed of 12 gauge 304L stainless steel material. The exterior of the body shall be prepared for job color paint finish.

To eliminate unnecessary seams and overlapping areas, the construction of all component panels shall feature brake-formed fabrication. Angle iron framing is not acceptable. Component panels shall be in single metal sections wherever possible.

The assembly of body component panels shall be with inert gas, continuous feed welders. Stick welding is not acceptable. The use of sheet metal fasteners in assembly of body components is unacceptable.

Structural supports shall be incorporated into the overall design to provide the necessary support for component panels and body modules.

The body shall be a free-standing module supported only by the top of the frame rails using a transverse 3/16" thick 304L stainless steel structure assembly. This structure shall be secured in a minimum of four (4) locations, using a double flex mount system and angle brackets bolted to both the body structural assembly and the sides of the chassis frame rails using Grade 8 fasteners. Mylar shall be used to isolate the structural assembly from the frame rails. A body substructure using carbon steel, outrigger arms or any other mounting method is not acceptable. This design is required to eliminate shift and stress on the body module and component panels.

Each compartment door opening shall have at least a double brake-formed door jamb. The brake formed door jamb is required for superior strength and body construction integrity. Doors that seal only at the exterior surface of the body or utilize only a single brake-formed door jamb are not acceptable.

Specification for: Zion Fire and Rescue Apparatus Specifications	Bidder Complies	
	Yes	No
<p>The compartment floor construction shall permit easy cleaning with a true sweep-out design. The outer floor area, making up the compartment door jamb, shall incorporate a triple brake-formed construction for recessed door seal inboard of the exterior of the body. This shall be required to eliminate road splash and debris from entering the compartments at floor level. Angles, lips, or door moldings are not acceptable in the base of the door opening. There shall be a minimum of two (2) 3/8" drain holes in the compartment floors.</p> <p>Each interior compartment seam shall be sealed with a silver silicone caulk. The rear walls of each compartment shall be provided with a bright stainless steel louvered vent.</p> <p>BODY COMPT LEFT SIDE</p> <p>Driver Side Body Compartments</p> <p>Compartment L1, ahead of the rear wheels, shall be 48.0" wide x 90.0" high x 27.0" deep.</p> <p>Compartment L2, above the rear wheels, shall be 60.0" wide x 58.8" high x 27.0" deep.</p> <p>Compartment L3, behind the rear wheels, shall be 54.0" wide x 90.0" high x 27.0" deep.</p> <p>BODY COMPT RIGHT SIDE</p> <p>Officer Side Compartments</p> <p>Compartment R1, ahead of the rear wheels, shall be 48.0" wide x 90.0" high x 27.0" deep in lower section and 14.0" deep in the upper section.</p> <p>Compartment R2, above the rear wheels, shall be 60.0" wide x 58.8" high x 14.0" deep.</p> <p>Compartment R3, behind the rear wheels, shall be 54.0" wide x 90.0" high x 27.0" deep in lower section and 14.0" deep in the upper section.</p>		

Specification for: Zion Fire and Rescue Apparatus Specifications

**Bidder
Complies**

Yes No

BODY COMPT REAR

Rear Panel Area

The entire rear panel of the body shall be covered using smooth FRP panels for application of the Chevron graphics. The rear panel area shall be of the flat back body design.

A 12" deep rear tailboard of 3/16" aluminum treadplate shall be provided full width of the body. The standing surface of the tailboard shall be provided with non-skid Bustin Tread welded inserts.

Grab rails shall be provided one each side on the rear of the body, and a horizontal grab rail shall be provided below the hose bed.

Rear Panel Compartment

Compartment B1, located centered ahead of the rear tailboard, shall be 46" wide x approximately 50" high x 32" deep. Solid walls shall be provided on both sides of the rear compartment. This compartment shall be of 12 gauge 304L stainless steel.

DOORS

Roll Up Compartment Door

A ROM brand roll up door with satin finish shall be provided on a compartment up to 45" tall. The door(s) shall be installed in the following location(s): L2 and R2.

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

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

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

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

Specification for: Zion Fire and Rescue
Apparatus Specifications

**Bidder
Complies**

Yes No

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

Roll Up Compartment Door

A ROM brand roll up door with satin finish shall be provided on a compartment greater than 45" tall. The door(s) shall be installed in the following location(s): L1, L3, R1, R3, and B1.

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

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

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

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

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

Drip Pan

A ROM drip pan shall be supplied for each roll-up door. The drip pan shall be made from a high strength aluminum alloy. The splashguard and end caps shall be made from extruded and injection molded high-impact plastic. Drip pan location(s): L1, L2, L3, R1, R2, R3, and B1.

SHELVING REQUIREMENTS

Floor Mounted Slide Out Tray

3/16" aluminum tray, sized to fit the compartment, will be installed on 1000 lb. capacity SlideMaster slides.

There shall be an aluminum floor mounted slide out tray provided for the following compartments L1, L3, R1, R3, and B1.

Specification for: Zion Fire and Rescue Apparatus Specifications	Bidder Complies	
	Yes	No
<p>Adjustable Slide Out Tray</p> <p>3/16" aluminum tray, sized to fit the compartment, will be installed on 250 lb. capacity SlideMaster slides.</p> <p>There shall be an aluminum floor mounted slide out tray provided for the following compartments L1.</p> <p>Adjustable Slide Out/Tilt Out Tray</p> <p>3/16" aluminum tray, sized to fit the compartment, will be installed on 150 lb. capacity SlideMaster slide out/tilt out slides.</p> <p>There shall be an aluminum floor mounted slide out tray provided for the following compartments L1, L2, and L3.</p> <p>Adjustable Shelf</p> <p>There shall be an aluminum adjustable shelf provided for compartment L2 and L3 upper.</p> <p>The shelf shall be constructed of 3/16" (.187") smooth aluminum plate. The shelf shall have a minimum 2" front and rear lips to accommodate optional plastic interlocking compartment tile systems. For additional strength and reinforcement of the shelf a return break shall be provided on the outward lip. The adjustable shelf shall be capable of holding 250 lbs.</p> <p>The shelf shall be sized, width and depth, to match the size and location in the compartment.</p> <p>Adjustable Tracks</p> <p>Tracks shall be provided in all body compartments, for use with adjustable shelves and/or trays in deep non-transverse compartments. The tracks shall be vertically mounted and attached to the side and/or rear walls of the compartments.</p> <p>Adjustable Swing Out Tool Board</p> <p>A 3/16" DA finished aluminum swing out tool board, sized to fit compartment. The tool board shall hold 250 lbs. The tool board will be hinged forward. The tool board will have two (2) push latches to hold tool board closed.</p> <p>The swing out tool board shall be located in the R2 compartment.</p> <p>Permanent Shelf</p> <p>There shall be a permanent mounted stainless steel shelf provided for compartment R1 and R3. The shelf shall be at the offset within the compartment.</p>		

Specification for: Zion Fire and Rescue Apparatus Specifications	Bidder Complies	
	Yes	No
<p>The shelf shall be constructed of 12ga stainless steel. The shelf shall have a minimum 2" front lip for added strength and reinforcement and to accommodate optional plastic interlocking compartment tile systems.</p> <p>The shelf shall be capable of holding 250 lbs.</p> <p>COVERS</p> <p>Hose Bed Cover</p> <p>A cover constructed of red 18 oz. PVC vinyl coated polyester shall be installed over the apparatus hose bed. The base fabric shall be 1000 x 1300 Denier Polyester with a fabric count of 20 x 20 square inch.</p> <p>The front edge of the cover shall be mechanically attached to the body. The sides of the cover shall be held in place with heavy duty Velcro strips running the length of the hose bed. The rear of the cover shall have an integral flap that extends down to cover the rear of the hose bed. This flap shall be secured in place with heavy duty nylon straps to comply with the latest edition of NFPA 1901.</p> <p>Vinyl Crosslay Cover</p> <p>A cover constructed of red 18 oz. PVC vinyl coated polyester shall be installed on the crosslay. The base fabric shall be 1000 x 1300 Denier Polyester with a fabric count of 20 x 20 per square inch.</p> <p>The cover shall be held in place across the top of the body by chrome snaps. The sides of the cover shall have integral flaps that extend down to cover the sides of the crosslay. The side flaps shall be secured in place to comply with the latest edition of NFPA 1901.</p> <p>PUMP MODULE</p> <p>Pump Module Width</p> <p>Pump module shall be 76" wide.</p> <p>Lower Pump Module</p> <p>A lower pump enclosure module shall be installed. The substructure shall be constructed entirely of 12 gauge 304L stainless steel using a break-formed design for the components. Transverse 3/16" thick 304L stainless steel break-formed cross members shall support the 12-gauge substructure and the exterior panels independently from the cab and rear body of the apparatus. The cross members shall be isolated from the frame rails using Mylar.</p> <p>The pump module shall be 50" wide front to back, plus flex joints.</p> <p>The pump enclosure shall be 76" wide side to side, plus running boards.</p>		

Specification for: Zion Fire and Rescue
Apparatus Specifications

**Bidder
Complies**

Yes No

The pump enclosure shall be a free-standing module supported only by the top of the frame rails, in a minimum of four places, and secured with angle brackets bolted to both the pump enclosure support cross rails and the side of the chassis frame rails. This design is required to eliminate shift and stress on the pump enclosure, pump panels and running boards. A pump enclosure constructed using carbon steel or any other mounting method is not acceptable.

Maximum size brushed stainless steel fully removable bolt-on access panels shall be installed on each side of the pump enclosure.

All side panels, instrument panels, and bezels shall be cut and de-burred to eliminate sharp edges. For best uniform appearance, all brushed finish on the stainless-steel trim pieces shall run in the same horizontal direction.

Running Boards

Two (2) 3/16" non-skid aluminum treadplate running boards shall be bolted to the pump enclosure substructure. Running boards shall be a minimum of 12" deep. For increased slip resistance, the standing surface of the running boards shall be provided with Bustin Tread non-skid inserts.

Upper Pump Module

The upper pump enclosure area shall be built of 304L stainless steel with brushed stainless steel outer trim to blend with the lower module trim pieces.

Crosslay Preconnects

Two (2) preconnected crosslay compartments shall be provided at the rear of the upper pump module. The crosslay divider shall be 1/4" thick smooth aluminum with DA finish.

There shall be a stainless-steel floor which shall include holes for ventilation and cut-outs for the swivel elbows to allow preconnected hose to be deployed from both sides of the truck.

Each of the crosslays shall accommodate up to 400' of double jacket preconnected hose for the selected discharges in a triple wide stack.

Storage Area

The remaining area above the enclosure shall be used for top open miscellaneous equipment storage. The floor in this area shall be non-skid aluminum treadplate.

Specification for: Zion Fire and Rescue Apparatus Specifications

**Bidder
Complies**

Yes No

PUMP PANELS

Side Mount Pump Panels

The driver and officer side pump panels shall be constructed of 14-gauge stainless steel. Each panel shall have the ability to be removed from the module for easier access and for maintenance in the pump area.

Control Panel Access

The gauge panel shall swing downward/forward for access to electrical connections on panel. Includes two (2) cable hold opens, and push button latches.

MISC PUMP PANEL OPTIONS

Pump Panel Tags

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

PUMP MODULE OPTIONS

Module Logos

Logos with the OEM brand name shall be provided and shall be mounted one (1) each side on pump module/pre-connect panels. Logos shall be sized as applicable to available space on panel(s).

WATER TANK

1030 Gallon Water Tank

A 1030 gallon (U.S.) "L" booster tank shall be supplied.

The booster tank shall be constructed of polypropylene material. The booster tank shall be completely removable without disturbing or dismounting the apparatus body structure. The top of the booster tank is fitted with removable lifting assembly designed to facilitate tank removal.

The booster tank top, sides, and bottom shall be constructed of a minimum 1/2" (0.50") thick black UV-stabilized copolymer polypropylene. Joints and seams shall be fused using nitrogen gas as required and tested for maximum strength and integrity. The tank construction shall include technology wherein a sealant shall be installed between the plastic components prior to being fusion welded. This sealing method will provide a liquid barrier offering leak protection in the event of a weld compromise. The tank cover shall be constructed of 1/2" thick polypropylene and UV stabilized, to incorporate a multi-piece locking design, which allows for individual removal and inspection if necessary. The tank cover(s) shall be flush or recessed 3/8" from the top of the tank and shall be fused to the tank walls and longitudinal partitions for

Specification for: Zion Fire and Rescue

Apparatus Specifications

**Bidder
Complies**

Yes No

maximum integrity. Each one of the covers shall have hold downs consisting of 2" minimum polypropylene dowels spaced a maximum of 40" apart. These dowels shall extend through the covers and will assist in keeping the covers rigid under fast filling conditions.

The tank shall have a combination vent and manual fill tower with a hinged lid. The fill tower shall be constructed of 1/2" polypropylene and shall be a typical dimension of 8" x 8" outer perimeter (subject to change for specific design applications). The fill tower shall be blue in color indicating that it is a water-only fill tower. The tower shall have a 1/4" thick removable polypropylene screen and a polypropylene hinged cover. The capacity of the tank shall be engraved on the top of the fill tower lid.

The booster tank shall have two (2) tank plumbing openings. One (1) for a tank-to-pump suction line with an anti-swirl plate, and one (1) for a tank fill line. All tank fill couplings shall be backed with flow deflectors to break up the stream of water entering the tank, and be capable of withstanding sustained fill rates per the tank fill inlet size.

The sump shall be constructed of a minimum of 1/2" polypropylene. The sump shall have a minimum 3" N.P.T. threaded outlet for a drain plug per NFPA. This shall be used as a combination clean-out and drain. All tanks shall have an anti-swirl plate located approximately 3" above the inside floor.

The transverse and longitudinal swash partitions shall be manufactured of a minimum of 3/8" polypropylene. All partitions shall be equipped with vent and air holes to permit movement of air and water between compartments. The partitions shall be designed to provide maximum water flow. All swash partitions interlock with one another and are completely fused to each other as well as to the walls of the tank. All partitions and spacing shall comply with NFPA 1901. The walls shall be welded to the floor of the tank providing maximum strength.

Inside the fill tower there shall be a combination vent/overflow pipe. The vent overflow shall be a minimum of schedule 40 polypropylene pipe with an I.D. of 3" or larger that is designed to run through the tank. This outlet shall direct the draining of overflow water past the rear axle, thus reducing the possibility of freeze-up of these components in cold environments. This drain configuration shall also assure that rear axle tire traction shall not be affected when moving forward.

The booster tank shall undergo extensive testing prior to installation in the truck. All water tanks shall be tested and certified as to capacity on a calibrated and certified tilting scale.

Each tank shall be weighed empty and full to provide precise fluid capacity. Each tank shall be delivered with a Certificate of Capacity delineating the weight empty and full and the resultant capacity based on weight. Engineering estimates for capacity calculations shall not be permitted for capacity certification. The tank must be designed and fabricated by a tank manufacturer that is ISO 9001:2008 certified in each of its locations. The ISO certification must be to the current standard in effect at the time of the design and fabrication of the tank.

A tag shall be installed on the apparatus in a convenient location and contain pertinent information including a QR code readable by commercially available smart phones. The information contained on the tag shall include the capacity of the water and foam (s), the

Specification for: Zion Fire and Rescue

Apparatus Specifications

**Bidder
Complies**

Yes No

maximum fill and pressure rates, the serial number of the tank, the date of manufacture, the tank manufacturer, and contact information. The QR code will allow the user to connect with the tank manufacturer for additional information and assistance.

The tank shall have a limited Lifetime warranty that provides warranty service for the life of the fire apparatus in which the tank is installed. Warranties are transferable if the apparatus ownership changes by requesting the transfer from the tank manufacturer.

Tank capacity is 1030 US gallon / 857 Imperial gallons / 3898 Liters.

TANK PLUMBING

Tank Fill 2 Akron Valve

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

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

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

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

Tank-to-Pump

One (1) manually operated 3" Akron valve shall be installed between the pump suction and the booster tank. Includes flex hose with stainless steel hose clamps for connection to the 4" tank sump outlet. The valve control shall be located at the pump operator's panel and shall visually indicate the position of the valve at all times.

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

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

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

Specification for: Zion Fire and Rescue

Apparatus Specifications

**Bidder
Complies**

Yes No

A check valve shall be provided in the tank to pump supply line to prevent the possibility of "back filling" the water tank. The valve control shall be located at the pump operator's panel and shall visually indicate the position of the valve at all times.

FOAM TANK

30 Gallon Foam Tank

A 30-gallon (U.S.) foam cell for Class A foam shall be supplied. The foam cell shall be integral to the water tank.

The integral tank top, sides, and bottom shall be constructed of black polypropylene material. Joints and seams shall be fused using nitrogen gas as required and tested for maximum strength and integrity. The tank construction shall include technology wherein a sealant shall be installed between the plastic components prior to being fusion welded. This sealing method will provide a liquid barrier offering leak protection in the event of a weld compromise. The copolymer polypropylene material shall be used for its high strength and corrosion resistance for a prolonged tank life.

The foam tank shall have a manual fill tower. The fill tower shall be constructed of 1/2" polypropylene and shall be a typical dimension of 8" x 8" outer perimeter (subject to change for specific design applications). Foam fill tower shall be constructed of a Green colored material indicating type of foam utilized. The capacity of the tank shall be engraved on the top of the fill tower lid. The fill tower shall be located in the forward area of the tank. The tower shall have a 1/4" thick removable polypropylene screen. Inside the fill tower, approximately 1.5" down from the top, there shall be an anti-foam fill tube that extends down to the bottom of the tank. A pressure vacuum vent shall be provided in the lid of the fill tower. The foam fill tower shall be removable to facilitate the cleaning of the foam tank.

The foam tank shall undergo extensive testing prior to installation in the truck. All foam tanks shall be tested and certified as to capacity. The tank must be designed and fabricated by a tank manufacturer that is ISO 9001:2008 certified in each of its locations. The ISO certification must be to the current standard in effect at the time of the design and fabrication of the tank.

The tank shall have a limited Lifetime warranty that provides warranty service for the life of the fire apparatus in which the tank is installed. Warranties are transferable if the apparatus ownership changes by requesting the transfer from the tank manufacturer.

LADDER STORAGE / RACKS

Ladder Brand

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

Ladders

The length of ladders capable of being stored shall be the following: 24' 2-section, 14' roof ladder and 10' attic ladder w/shoes.

Specification for: Zion Fire and Rescue Apparatus Specifications

**Bidder
Complies**

Yes No

Storage Tunnel

A storage tunnel shall be provided, constructed of break formed .125" aluminum sheet, located behind the officer upper compartments. Includes a hinged rear access door (wired to door ajar) with a 2-point bent D-ring latch.

Tunnel shall be capable of holding: (1) 2-section ladder, (1) roof ladder, (1) attic ladder, (2) pike poles, and (2) 6" x 10' hard suction hoses, individually vertically stacked, with stops.

HANDRAILS / STEPS

Hose Bed Folding Steps

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

Innovative Controls dual lighted folding step with LED lights integral to the step on the top to provide NFPA requirements of 2 fc (20 lx) on the stepping surface. Folding step shall also have a LED light integral to the bottom of the step to meet NFPA requirements of a stepping surface up to 18" below the step. The folding step shall sustain a minimum static load of 500 lb with a 3 to 1 safety factor. The folding step shall also meet NFPA slip resistance qualifications. Corrosion resistance shall be demonstrated by a 1000 hr. salt spray test with no visible signs of deterioration of the step body or hardware.

One (1) hand rail shall be installed (as applicable) in compliance with current NFPA. The hand rail shall be constructed of 6063T5 1.25" OD anodized aluminum tube, with an integral ribbed surface to assure a good grip for personnel safety, mounted between chrome stanchions.

Intermediate Step

An 8" deep non-skid aluminum treadplate step with mitered corners shall be installed above the rear panel compartment door opening for ease of access to the upper body area. The step shall include a Bustin tread insert for increased traction and drainage. The width of the step shall be 38" when one rear discharge is selected or 31" when two rear discharges are selected.

Folding Steps [Qty. 6]

Innovative Controls dual lighted LED folding step(s) shall be located on the front of the passenger and driver side body (three per side). The folding step(s) shall meet current NFPA in step height and surface area.

Innovative Controls dual lighted LED folding step with LED lights integral to the step on the top to provide NFPA requirements of 2 fc (20 lx) on the stepping surface. Folding step shall also have a LED light integral to the bottom of the step to meet NFPA requirements of a stepping surface up to 18" below the step. The folding step shall sustain a minimum static load of 500 lb. with a 3 to 1 safety factor. The folding step shall also meet NFPA slip resistance qualifications.

Specification for: Zion Fire and Rescue Apparatus Specifications

**Bidder
Complies**

Yes No

Corrosion resistance shall be demonstrated by a 1000 hr. salt spray test with no visible signs of deterioration of the step body or hardware.

One (1) hand rail shall be installed in compliance with current NFPA. The hand rail shall be constructed of 6063T5 1.25" OD anodized aluminum tube, with an integral ribbed surface to assure a good grip for personnel safety, mounted between chrome stanchions.

MISC BODY OPTIONS

Mud flaps

Black mud flaps shall be provided for the body wheel wells.

Hose Bed Divider [Qty: 2]

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

The hose bed divider shall be constructed of 1/4" (0.25") smooth aluminum plate with an extruded aluminum base welded to the bottom. The rear end of the divider shall have a 3" radius corner to protect personnel. The divider shall be natural finish aluminum for long-lasting appearance and shall be sanded and de-burred to prevent damage to the hose.

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

Hose Bed Divider Hand Hold

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

Fuel Fill

A recessed fuel fill shall be provided at the driver side rear wheel well area. Below the fill shall be a 304L stainless steel scuff plate. The scuff plate will extend around the fuel fill and down to the fender and/or edge of the body.

Rear Fender Panels

The construction of the wheel well assemblies shall be an integral part of the overall body design. Rear fender panels shall be formed of 12 gauge 304L stainless steel.

Mirror polished stainless steel fenderettes shall be installed at the outer panels and protrude a maximum of 3/4". Black closed cell foam rubber shall be installed between the flare and outer wheel well panel. Mounting hardware shall not be visible on the exterior of the body.

Bolt-on 16 gauge 304L stainless steel wheel well liners shall be installed, unpainted. A minimum of 1/4" spacing shall be provided at the lower leading and trailing mounting areas for proper drainage and ventilation.

Hose Body Area

The overall body height shall be 94" from the bottom of the body to the top of the upper hose bed side sheets.

Specification for: Zion Fire and Rescue

Apparatus Specifications

**Bidder
Complies**

Yes No

The upper hose body shall be 59" wide, constructed of the same 304L stainless steel material as the compartments and shall use welded construction.

Hose bed flooring shall be Duradek T3500 white fiberglass grating installed full length and full width of the hose bed for superior drainage and hose ventilation.

Body Rubrail Package

The main body of the apparatus shall have an extruded aluminum rubrail package installed below the lower side compartments and full width of the rear tailboard. Each rubrail shall include a white reflective surface.

SCBA BOTTLE STORAGE

SCBA Wheel Well Bottle Storage

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

Each storage area shall provide individual storage of a bottle and shall not allow forward or rearward movement of the bottle. The bottle(s) shall be removable from the storage area without the bottle(s) coming into contact with any surface area of the wheel well (NO EXCEPTIONS).

SCBA Strap [Qty: 7]

Straps shall be provided in each exterior storage compartment to provide secondary means to hold each SCBA bottle in the compartment. The straps shall be constructed from 1" nylon webbing formed in a loop. The strap(s) shall be mounted to the storage compartment ceiling directly inside the door opening at each bottle location.

PUMPS

Pump Rating

The fire pump shall be rated at 1500 GPM.

Fire Pump System

The pump shall be a midship-mounted Hale QMAX single stage centrifugal pump. The pump shall be mounted on the chassis frame rails of commercial or custom truck chassis and have the capacity of 1,250 to 2,250 gallons per minute (U.S. GPM) NFPA 1901 rated performance, and shall be split-shaft driven from the truck transmission.

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

Specification for: Zion Fire and Rescue

Apparatus Specifications

**Bidder
Complies**

Yes No

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

The pump shaft shall be heat-treated, corrosion-resistant stainless steel and shall be rigidly supported by three (3) bearings for minimum deflection. The sleeve bearing is to be lubricated by a force fed, automatic oil lubricated design, pressure-balanced to exclude foreign material. The remaining bearings shall be heavy-duty, deep groove ball bearings in the gearbox and shall be splash-lubricated. Pump shaft must be sealed with double-lip oil seal to keep road dirt and water out of the gearbox.

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

Discharge Manifold

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

Pump Shift

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

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

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

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

Test Ports

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

Gearbox Cooler

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

Specification for: Zion Fire and Rescue Apparatus Specifications

**Bidder
Complies**

Yes No

PUMP CERTIFICATION

Pump Certification

The pump, when dry, shall be capable of taking 6" hard suction hose and discharging water in accordance with current NFPA 1901. The pump shall be tested at the manufacturer's facility by an independent, third-party testing service. The conditions of the pump test shall be as outlined in current NFPA 1901.

The tests shall include, at a minimum, the pump test, the pumping engine overload test, the pressure control system test, the priming device tests, the vacuum test, and the water tank to pump flow test as outlined in current NFPA 1901.

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

The pump shall deliver the percentage of rated capacities at pressures indicated below:

100% of rated capacity at 150 psi net pump pressure

100% of rated capacity at 165 psi net pump pressure

70% of rated capacity at 200 psi net pump pressure

50% of rated capacity at 250 psi net pump pressure

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

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

PUMP OPTIONS

Speed Counter

The test connection shall be installed on the pump panel to manually verify the vehicle engine speed displayed on the electronic tachometer.

Steamers, Flush+1

The pump 6" steamer intake(s) shall be mounted approximately 1" from the pump panel to back of cap when installed. The "Flush+1" dimension can vary + or - 1-1/4" or as practicable depending on the pump module width and options selected. (Example 72" or 76" modules.)

Location: driver's side and officer's side.

Pump Seal Packing

The pump shaft shall have only one (1) packing gland located on the inlet side of the pump. It shall be of split design for ease of repacking. The packing gland shall be of a design to exert

Specification for: Zion Fire and Rescue

Apparatus Specifications

**Bidder
Complies**

Yes No

uniform pressure on packing and to prevent cocking and uneven packing load when tightened. The packing rings shall be permanently lubricated, graphite composition and have sacrificial zinc foil separators to protect the pump shaft from galvanic corrosion.

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

Master Drain Valve

A manual master drain valve shall be installed on the pump panel. The master pump drain assembly shall consist of a Class 1 bronze master drain with a rubber disc seal. The master drain shall have a rubber seal to prevent water from running out on the running board.

The manual master drain valve shall have twelve (12) individual-sealed ports that allow quick and simultaneous draining of multiple intake and discharge lines. It shall be constructed of corrosion-resistant material and be capable of operating at a pressure of up to 600 PSI.

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

Pump Cooler

The pump shall have a 3/8" line installed from the pump discharge to the booster tank to allow a small amount of water to circulate through the pump casing in order to cool the pump during sustained periods of pump operation when water is not being discharged. The pump cooler line shall be controlled from the pump operator's panel by a Innovative Controls 1/4 turn valve with "T" handle. Each 1/4 turn handle grip shall feature built-in color-coding labels and a verbiage tag

Priming System

An electrically-driven Hale ESP priming pump shall be provided for the water pump. The primer shall be positive displacement rotary vane type that requires no lubricant. The primer motor shall be heat-treated, anodized aluminum specially coated for wear and corrosion resistance.

One (1) priming control, located at the pump operator's position, shall open the priming valve and start the priming motor. The priming valve shall be electronically interlocked to the "Park Brake" circuit to allow priming of the pump before the pump is placed in gear.

INTAKES

Left Intake 2.5 Akron Valve

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

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

Specification for: Zion Fire and Rescue

Apparatus Specifications

**Bidder
Complies**

Yes No

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

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

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

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

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

INTAKE OPTIONS

Intake Pressure Relief

A18 Series - PRESSURE RELIEF VALVE - TFT's pressure relief valve is adjustable from 50 to 250 psi (3 to 14 bar) with easy to see 25 psi (2 bar) increments. The aluminum casting is plastic impregnated, hard coat anodized, and TFT powder coat finished inside and out for maximum corrosion protection. Works with Darley, Waterous, or Hale bolt hole patterns for direct use on pump flanges.

DISCHARGES AND PRECONNECTS

Front Jump Line 1.5" Akron Valve

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

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

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

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

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

Specification for: Zion Fire and Rescue

Apparatus Specifications

**Bidder
Complies**

Yes No

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

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

Deck Gun 3" Discharge Akron Valve

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

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

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

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

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

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

Front Bumper Discharge, Brass Swivel, In Center Bumper Tray

There shall be a brass swivel provided for the front bumper discharge located in hose tray, center, front bumper on lower back wall.

1.5" Discharge, Single Crosslay Akron Valve [Qty: 2]

One (1) single crosslay discharge shall be provided at the front area of the body. The crosslay shall include one (1) 2" brass swivel with a 1-1/2" hose connection to permit the use of hose from either side of the apparatus.

The crosslay hose bed shall consist of a 2" heavy-duty hose coming from the pump discharge manifold to the 2" swivel. The hose shall be connected to a manually operated 2" Akron valve. The valve shall be an Akron 8800HD series with a 316-stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless-steel ball when in a throttle position with water flowing through it.

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

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

Specification for: Zion Fire and Rescue

Apparatus Specifications

**Bidder
Complies**

Yes No

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

Location: crosslay 1 & 2.

Discharge Left Panel 2.5" Akron Droop [Qty: 2]

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

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

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

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

The discharge shall extend out beyond the pump panel with a 30-degree downward angle with 2-1/2" NST threads to help prevent kinking of the discharge hose. The 30-degree chrome droop shall be an integral part of the discharge valve and shall be equipped with a chrome plated rocker lug cap with a retainer chain.

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

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

Location: left side discharge 1 and left side discharge 2.

Discharge Right Panel 2.5" Akron Droop [Qty: 1]

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

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

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

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

The discharge shall extend out beyond the pump panel with a 30-degree downward angle with chrome plated 2-1/2" NST threads to help prevent kinking of the discharge hose. The 30-degree

Specification for: Zion Fire and Rescue Apparatus Specifications	Bidder Complies	
	Yes	No
<p>chrome droop shall be an integral part of the discharge valve and shall be equipped with a chrome plated rocker lug cap with a retainer chain.</p> <p>All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.</p> <p>Location: right side discharge 2.</p> <p>Right Rear 2.5" Discharge Akron Valve [Qty: 1]</p> <p>One (1) 2-1/2" discharge outlet with a manually operated Akron valve shall be supplied to the right rear of the apparatus by a 2-1/2" stainless steel pipe.</p> <p>The valve shall be an Akron 8800HD series with a 316-stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless-steel ball when in a throttle position with water flowing through it.</p> <p>The valve shall be of the unique Akron swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.</p> <p>The discharge shall extend out beyond the body with a 45-degree downward angle with 2-1/2" NST threads to help prevent kinking of the discharge hose. The 45-degree chrome droop shall be an integral part of the discharge valve and shall be equipped with a chrome plated rocker lug cap with a retainer chain.</p> <p>The valve control shall be located at the pump operator panel and shall visually indicate the position of the valve at all times.</p> <p>All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.</p> <p>Location: right rear discharge.</p> <p>Discharge Right Panel 3" Akron Droop [Qty: 1]</p> <p>One (1) 3" discharge outlet with a manually operated Akron valve shall be provided at the right-side pump panel.</p> <p>The discharge shall be equipped with a device that shall not allow the valve to open or close in less than three (3) seconds.</p> <p>The valve shall be an Akron 8800HD series with a 316-stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless-steel ball when in a throttle position with water flowing through it.</p> <p>The valve shall be of the unique Akron swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.</p> <p>The valve control shall be located at the pump operator's panel and shall visually indicate the position of the valve at all times.</p>		

Specification for: Zion Fire and Rescue Apparatus Specifications		Bidder Complies	
		Yes	No
<p>The discharge shall extend out beyond the pump panel with a 30-degree downward angle with chrome plated 3" NST threads to help prevent kinking of the discharge hose. The 30-degree chrome droop shall be an integral part of the discharge valve and shall be equipped with a chrome plated rocker lug cap with a retainer chain.</p> <p>All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.</p> <p>Location: right side discharge 1.</p> <p>Deck Gun Location</p> <p>Deck gun piping shall be positioned centered in deck gun channel. This location shall allow for optimal operation of a deck gun monitor once installed.</p> <p>Extend-A-Gun</p> <p>A Task Force Tips 18" Extend-A-Gun piping shall be supplied for the deck gun discharge to allow for raising and lowering the deck gun monitor.</p> <p>The Extend-A-Gun shall include a raised monitor sensor connected to the door ajar light.</p> <p>Deck Gun Mount</p> <p>TFT Deck Gun mount adapter for 3 " NPT Pipe.</p> <p>TFT Deck Gun</p> <p>TFT Model XFC-42 Deck Gun Package with upper monitor, ground base, ground base mount, stream shaper and stacked tips</p> <p>DISCHARGE OPTIONS</p> <p>Auto Drain Valve</p> <p>The specified discharge shall be supplied with a Class 1 automatic 3/4" drain valve assembly. The automatic drain shall have an all-brass body with stainless steel check assembly. The drain shall normally be open and automatically close when the pressure is greater than 6 psi.</p> <p>For the deck gun.</p> <p>IC Push/Pull Control</p> <p>The apparatus pump panel shall be equipped with Innovative Controls Side Mount Valve Controls. The ergonomically designed ¼ turn push-pull T-handle shall be chrome-plated zinc with recessed labels for color-coding and verbiage. An anodized aluminum control rod and housing shall, together with a stainless spring steel locking mechanism, eliminate valve drift. Teflon impregnated bronze bushings in both ends of the rod housing shall minimize rod deflection, never need lubrication, and ensure consistent long-term operation. The control assembly shall include a decorative chrome-plated zinc panel-mounting bezel with areas for color-coding and/or FOAM and CAFS identification labels.</p>			

Specification for: Zion Fire and Rescue Apparatus Specifications

**Bidder
Complies**

Yes No

Bleeder Drain Valve [Qty: 9]

The bleeder/drain valves shall be Innovative Controls ¾" ball brass drain valves with chrome-plated lift lever handles and ergonomic grips. Each lift handle grip shall feature built-in color-coding labels and a verbiage tag identifying each valve, also supplied by Innovative Controls. The color labels shall also include valve open and close verbiage.

Discharge/Intake Bezel

Innovative Controls intake and/or discharge swing handle bezels shall be installed to the apparatus with mounting bolts. These bezel assemblies will be used to identify intake and/or discharge ports with color and verbiage. These bezels 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.

PRESSURE GOVERNORS

Pump Pressure Governor

The apparatus shall be equipped with a Class 1 "TOTAL PRESSURE GOVERNOR" (TPG) Integrated pump control system. The TPG shall have a weatherproof color display. The TPG will operate as an engine/pump pressure governor/throttle system that is connected directly to the Electronic Control Module (ECM) mounted on the engine. The TPG is to operate as a pressure sensor (regulating) governor (PSG).

The TPG shall display engine RPM, oil pressure, engine temperature and voltage along with providing critical warnings. The warning levels for oil pressure, high engine temperature, low voltage and high voltage shall be independently programmable.

GAUGES

2.5" Gauges [Qty: 9]

The valve discharge gauges shall be 2.5" (63mm) diameter Innovative Controls pressure gauges. Each gauge shall have a rugged corrosion free stainless steel case and clear scratch resistant molded crystals with captive O-ring seals to ensure distortion free viewing and 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 -40F to +160F. 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 stainless steel bezel shall be provided to prevent corrosion and protect the lens and gauge case. The gauges shall be installed into decorative chrome-plated mounting bezels that incorporate valve-identifying verbiage and/or color labels. The gauges shall display a range from 0 to 400 psi with black graphics on a white background.

Specification for: Zion Fire and Rescue Apparatus Specifications

**Bidder
Complies**

Yes No

4" Master Pressure Gauges with Bezel

The master intake and master discharge gauges shall be 4"(101mm) diameter IC pressure gauges. Each gauge shall have a rugged corrosion free stainless steel case and clear scratch resistant molded crystals with captive O-ring seals to ensure distortion free viewing and 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 -40F to +160F. Each gauge shall meet ANSI B40.1 Grade 1A requirements with an accuracy of +/- 1% 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.

The two master gauges shall be installed into decorative chrome-plated zinc mounting bezel that also incorporates a test port manifold and a graphic overlay that identifies the master intake and discharge gauges, the vacuum test port, and the pressure test port. The test port manifold is solid cast brass with chrome plated plugs. The master gauges shall be installed on the pump panel no more than 6 inches apart. The gauge on the left shall be the master pump intake gauge and display a range from 30" vacuum to 400 psi with black graphics on a white background. The gauge on the right shall be the master pump discharge gauge and display a range from 0 to 400 psi with black graphics on a white background.

GAUGE IC SL PLUS LED WATER TANK LEVEL

An Innovative Controls SL Plus Tank Level Monitor System shall be installed. The system shall include one [1] electronic display module(s), a stainless-steel pressure transducer sender unit, and the necessary wiring with water-tight plug terminations that do not require sealing grease. The master display module shall show the tank level using 16 super-bright easy-to-see LEDs. Tank level indication shall be achieved by the appropriate illumination of 4 horizontal rows of LEDs, with 4 LEDs per row. Full and near-full levels shall be indicated with the illumination of all 4 rows of LEDs, including the illumination of the top row of 4 green LEDs. Tank levels between ½ and ¾ full shall be indicated with the illumination of the bottom 3 rows of LEDs, including the illumination of the top row of 4 blue LEDs. Tank levels between ¼ and ½ full shall be indicated with the illumination of the bottom 2 rows of LEDs, including the illumination of the top row of 4 amber LEDs. Tank levels between ¼ full and near empty shall be indicated with the illumination of the bottom row of 4 red LEDs only. Tank levels between near empty and empty shall be indicated by flashing the bottom row of 4 red LEDs.

The master display shall have a backlit area above at the top with illuminated [water icon/foam icon/foam A icon/foam B icon/WATER LEVEL text/FOAM LEVEL text/FOAM A text/FOAM B text] and a backlit area at the bottom with illuminated [tank capacity/IC logo/OEM logo]. A wide-angle polycarbonate diffusion lens in front of the LEDs shall produce a 180° viewing angle. The electronic display module shall be waterproof and shock resistant being encapsulated in a urethane-based potting compound. The potted display electronics shall be integral to a chrome-plated panel-mount reflector that is secured to the apparatus panel with 4 screws installed from the inside of the panel or optional decorative bezel, through the reflector, and into 4 threaded inserts in the outer diffusion lens.

GAUGE IC SL PLUS LED FOAM A TANK LEVEL

An Innovative Controls SL Plus Tank Level Monitor System shall be installed. The system shall include one [1] electronic display module(s), a stainless-steel pressure transducer sender unit, and the necessary wiring with water-tight plug terminations that do not require sealing grease. The master display module shall show the tank level using 16 super-bright easy-to-see LEDs.

Specification for: Zion Fire and Rescue

Apparatus Specifications

**Bidder
Complies**

Yes No

Tank level indication shall be achieved by the appropriate illumination of 4 horizontal rows of LEDs, with 4 LEDs per row. Full and near-full levels shall be indicated with the illumination of all 4 rows of LEDs, including the illumination of the top row of 4 green LEDs. Tank levels between $\frac{1}{2}$ and $\frac{3}{4}$ full shall be indicated with the illumination of the bottom 3 rows of LEDs, including the illumination of the top row of 4 blue LEDs. Tank levels between $\frac{1}{4}$ and $\frac{1}{2}$ full shall be indicated with the illumination of the bottom 2 rows of LEDs, including the illumination of the top row of 4 amber LEDs. Tank levels between $\frac{1}{4}$ full and near empty shall be indicated with the illumination of the bottom row of 4 red LEDs only. Tank levels between near empty and empty shall be indicated by flashing the bottom row of 4 red LEDs.

The master display shall have a backlit area above at the top with illuminated [foam A icon/FOAM A text] and a backlit area at the bottom with illuminated [tank capacity/OEM logo].

A wide-angle polycarbonate diffusion lens in front of the LEDs shall produce a 180° viewing angle. The electronic display module shall be waterproof and shock resistant being encapsulated in a urethane-based potting compound. The potted display electronics shall be integral to a chrome-plated panel-mount reflector that is secured to the apparatus panel with 4 screws installed from the inside of the panel or optional decorative bezel, through the reflector, and into 4 threaded inserts in the outer diffusion lens.

FOAM SYSTEM & OPTIONS

Foam

There shall be a FoamPro 1600 fully automatic electronic direct injection foam proportioning system furnished and installed on the fire pump/CAFS assembly. The system shall be capable of Class A foam concentrates only. The proportioning operation shall be based on an accurate direct measurement of water flow with no restriction. The proportioning system shall meet NFPA standards for foam proportioning systems and the design shall have passed testing against SAE automotive reliability standards appropriate for the application. The foam system shall be installed in accordance with the manufacturer recommendations.

Controls shall be installed on the pump operator's panel and enable the pump operator to perform the following control and operation functions:

- Activate the foam system.
- Change foam concentrate proportioning rates from .1% to 1% in .1% increments.
- Feature a "low concentrate" warning indicator.

The foam system shall have a 12 volt, 3/4 hp "TENV" electric motor designed for wet and high humidity environments, direct coupled to a positive displacement piston type foam concentrate pump with a rated capacity of 1.7 gpm @ 200 psi (6.4 L/min@13.8 BAR) with maximum operating pressures up to 400 psi (27.6 BAR).

Foam System Certification

The foam system performance shall be tested and certified in compliance with the applicable NFPA 1901 requirements.

Specification for: Zion Fire and Rescue Apparatus Specifications

**Bidder
Complies**

Yes No

Foam System Plumbing

The specified foam system shall be plumbed to 1.5" first crosslay, 1.5" second crosslay, and front bumper discharge.

ELECTRICAL SYSTEMS

Multiplex Electrical System

Electrical System

The apparatus shall incorporate a Weldon V-MUX multiplex 12-volt electrical system. The system shall have the capability of delivering multiple signals via a CAN bus. The electrical system installed by the apparatus manufacturer shall conform to current SAE standards, the latest FMVSS standards, and the requirements of the applicable NFPA 1901 standards.

The electrical system shall be pre-wired for optional computer modem accessibility to allow service personnel to easily plug in a modem to allow remote diagnostics.

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

Any electrical junction or terminal boxes shall be weather-resistant and located away from water spray conditions.

Multiplex System

For superior system integrity, the networked multiplex system shall meet the following minimum component requirements:

- The network system must be Peer to Peer technology based on RS485 protocol. No one module shall hold the programming for other modules. One or two modules on a network referred to as Peer to Peer, while the rest of the network consists of a one master and several slaves is not considered Peer to Peer for this application.
- Modules shall be IP67 rated to handle the extreme operating environment found in the fire service industry.
- All modules shall be solid state circuitry utilizing MOS-FET technology and utilize Deutsch series input/output connectors.
- Each module that controls a device shall hold its own configuration program.
- Each module should be able to function as a standalone module. No "add-on" module will be acceptable to achieve this form of operation.
- Load shedding power management (8 levels).
- Switch input capability for chassis functions.
- Responsible for lighting device activation.

Specification for: Zion Fire and Rescue Apparatus Specifications	Bidder Complies	
	Yes	No
<ul style="list-style-type: none"> • Self-contained diagnostic indicators. • Wire harness needed to interface electrical devices with multiplex modules. • The grounds from each device should return to main ground trunk in each sub harness by the use of ultrasonic splices. <p>Wiring</p> <p>All harnessing, wiring and connectors shall be manufactured to the following standards/guidelines. No exceptions.</p> <ul style="list-style-type: none"> • NFPA 1901-Standard for Automotive Fire Apparatus • SAE J1127 and J1127 • IPC/WHMA-A-620 – Requirements and Acceptance for Cable and Wire Harness Assemblies. (Class 3 – High Performance Electronic Products) <p>All wiring shall be copper or copper alloys of a gauge rated to carry 125 of the maximum current for which the circuit is protected. Insulated wire and cable 8 gauge and smaller shall be SXL, GXL, or TXL per SAE J1128. Conductors 6 gauge and larger shall be SXL or SGT per SAE J1127.</p> <p>All wiring shall be colored coded and imprinted with the circuits function. Minimum height of imprinted characters shall not be less than .082” plus or minus .01”. The imprinted characters shall repeat at a distance not greater than 3”.</p> <p>A coil of wire shall be provided behind electrical appliances to allow them to be pulled away from mounting area for inspection and service work.</p> <p>Wiring Protection</p> <p>The overall covering of the conductors shall be loom or braid.</p> <p>Braid style wiring covers shall be constructed using a woven PVC-coated nylon multifilament braiding yarn. The yarn shall have a diameter of no less than .04” and a tensile strength of 22 lbs. The yarn shall have a service temperature rating of -65 F to 194 F. The braid shall consist of 24 strands of yarn with 21 black and 3 yellow. The yellow shall be oriented the same and be next to each other.</p> <p>Wiring loom shall be flame retardant black nylon. The loom shall have a service temperature of -40 F to 300 F and be secured to the wire bundle with adhesive-backed vinyl tape.</p> <p>Wiring Connectors</p> <p>All connectors shall be Deutsch series unless a different series of connector is needed to mate to a supplier’s component. The connectors and terminals shall be assembled per the connector/terminal manufacturer’s specification. Crimble/Solderless terminals shall be acceptable. Heat shrink style shall be utilized unless used within the confines of the cab.</p> <p>NFPA Required Testing of Electrical System</p> <p>The apparatus shall be electrical tested upon completion of the vehicle and prior to delivery. The electrical testing, certifications, and test results shall be submitted with delivery documentation</p>		

Specification for: Zion Fire and Rescue

Apparatus Specifications

**Bidder
Complies**

Yes No

per requirements of NFPA 1901. The following minimum testing shall be completed by the apparatus manufacturer:

1. Reserve capacity test:

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

2. Alternator performance test at idle:

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

3. Alternator performance test at full load:

The total continuous electrical load shall be activated with the engine running up to the engine manufacturer's governed speed. The test duration shall be a minimum of two (2) hours. Activation of the load management system shall be permitted during this test. However, an alarm sounded by excessive battery discharge, as detected by the system required in NFPA 1901 Standard, or a system voltage of less than 11.7 volts DC for a 12-volt nominal system, for more than 120 seconds, shall be considered a test failure.

4. Low voltage alarm test:

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

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:
 - a. The nameplate rating of the alternator.
 - b. The alternator rating under the conditions.
 - c. Each specified component load.
 - d. Individual intermittent loads.

Specification for: Zion Fire and Rescue Apparatus Specifications

**Bidder
Complies**

Yes No

Vehicle Data Recorder

A vehicle data recorder system shall be provided to comply with the 2009 and 2016 editions of NFPA 1901. The following data shall be monitored:

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

Occupant Detection System

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

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

The visual warning shall consist of a graphical representation of each cab seat in the multiplex display screen that will continuously indicate the validity of each seat position.

The system shall include a seat sensor and safety belt latch switch for each cab seating position, audible alarm and braided wiring harness.

Multiplex Display

The V-MUX multiplex electrical system shall include a Vista IV color display.

The display shall have the following features:

- Aspect ratio of 16:9 (Wide Screen)
- Diagonal measurement of no less than 7"
- Master warning switch
- Engine high idle switch
- Five (5) tactile switches to access secondary menus
- Eight (8) multi-function programmable tactile switches
- Specific door ajar indication
- Real time clock

Specification for: Zion Fire and Rescue Apparatus Specifications

**Bidder
Complies**

Yes No

- Provides access to the multiplex system diagnostics
- Video capability for optional back-up camera(s) and GPS display

The display shall be located driver's side engine cover.

LIGHT BARS

Light Bar Mount

One (1) pair of Whelen 1.5" tall (model MKEZ7) mounts shall be provided on the front light bar.

Light Bar

A Whelen Freedom IV Series 72" LED light bar model F4X7 with eight (8) LED modules shall be provided; two (2) front corner mounted LED modules, six (6) forward facing LED modules and two (2) side facing LED modules (with front vista windows) and a center Tomar strobe pre-emption device.

No rear facing LEDs.

The light bars shall have clear lenses.

The white LEDs (if equipped) shall be switched off in blocking right of way mode.

The light bar shall be installed centered on the front cab roof.

Front Light Bar Color(s)

The front light bar shall be provided with the following color LED modules: two (2) red front corner mounted LED modules, two (2) red forward facing LED modules, two (2) blue forward facing LED modules, two (2) white forward facing LED modules, and two (2) red side facing LED modules (with front vista windows).

WARNING LIGHT PACKAGES

Upper Side Zone Warning Lights

Two (2) Whelen 900 series Super LED model 90RR5FRR light heads with red lens shall be provided. The rectangular lights shall include chrome flanges where applicable.

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

One (1) Whelen 900 series Super LED light head each side of the apparatus. Locate one (1) each side at the highest most rearward point (as practical) of the body.

Specification for: Zion Fire and Rescue Apparatus Specifications

**Bidder
Complies**

Yes No

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

Upper Side Zone Warning Lights

Two (2) Whelen 900 series Super LED model 90RR5FRR light heads with red lens shall be provided. The rectangular lights shall include chrome flanges where applicable.

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

One (1) Whelen 900 series Super LED light head each side of the apparatus. Locate one (1) each side at the highest most forward point (as practical) of the body.

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

Upper Rear Facing Zone Warning Lights

Two (2) Whelen 900 series Super LED model 90RR5FRR light heads with red lenses shall be provided. The rectangular lights shall include chrome flanges where applicable.

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

One (1) light each side on the rear panel of the body, (1) on driver side and (1) on officer side upper corners (as practical).

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

Body Lower Level Warning Lighting

Six (6) Whelen LIN3 Super LED light heads with red LEDs and clear lenses shall be provided.

The light heads shall be located as follows (NO EXCEPTIONS):

- Two (2) Whelen LIN3 Super LED light heads shall be mounted below the forward body compartments and offset forward as practical.
- Two (2) Whelen LIN3 Super LED light heads shall be mounted below the rearward body compartments and offset rearward as practical.
- Two (2) Whelen LIN3 Super LED light heads shall be mounted below the rear taillights and offset outboard as practical.

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

Lower Level Warning

Four (4) Whelen 600 Series Super LED light heads shall be provided. All lights shall have red LEDs with clear lenses and chrome bezels.

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

- Two (2) 600 light heads on the front of the apparatus facing forward.
- Two (2) 600 light heads one (1) each side at the forward most point.

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

Specification for: Zion Fire and Rescue Apparatus Specifications

**Bidder
Complies**

Yes No

Lower Level Warning

Four (4) Whelen 600 Series Super LED light heads shall be provided. All lights shall have red/blue LEDs with clear lenses and chrome bezels.

The light heads shall be mounted as follows:

- Two (2) 600 light heads over rear fenders, both sides of body.
- Two (2) 600 light heads one (1) each, at the rear of the body centered between upper and lower zone warning lights, midway up rear body.

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

WARNING LIGHTS

Hazard (Door Ajar) Light

There shall be a 2" red LED hazard light installed as specified.

The light shall be located center overhead.

SIRENS

Mechanical Siren

A customer supplied chrome plated, pedestal mounted, Federal Q2B-P coaster siren shall be recess installed in the front bumper, and located in the center. An electric siren brake switch shall be located in the cab accessible to the driver and officer.

The siren shall be switched by two (2) push button switches with a chrome shroud. Located; one (1) driver side and one (1) officer side.

Electronic Siren

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

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

The siren shall be recessed mounted in the cab.

Electronic Siren Control Location

The electronic siren control shall be located in the center overhead.

SPEAKERS

Siren Speaker

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

Specification for: Zion Fire and Rescue

Apparatus Specifications

**Bidder
Complies**

Yes No

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

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

The speaker shall be located driver side front bumper.

DOT LIGHTING

Tail Lights

Two (2) Whelen model 600 series LED (Light Emitting Diode) lights with one (1) Whelen 600 series halogen light shall be installed in a Cast 3 housing in a vertical position each side at rear and wired with weatherproof connectors.

Light functions shall be as follows:

- LED red running light with red brake light in upper position.
- LED amber populated arrow pattern turn signal in middle position.
- Halogen 27 watt clear back-up light in lower position.

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

License Plate Light

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

License Plate Bracket

There shall be bracket fabricated from aluminum diamond plate, secured to rear of the body to accommodate a license plate.

LED Marker Lights

LED clearance/marker lights shall be installed as specified.

Upper Cab:

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

Lower Cab:

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

Upper Body:

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

Lower Body:

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

Specification for: Zion Fire and Rescue Apparatus Specifications

**Bidder
Complies**

Yes No

- A rectangular shaped reflector with a red colored lens shall be installed at the trailing edge on each side/rear of the apparatus body.
- A rectangular shaped reflector with an amber colored lens shall be installed at the leading edge on each side of the apparatus body.

LIGHTS - COMPARTMENT, STEP, and GROUND

Compartment Light Package

There shall be a minimum of one (1) TecNiq model T440 4" circular LED (Light Emitting Diode) light mounted in each body compartment greater than 4 cu. ft. Compartments over 36" in height shall have a minimum of two (2) lights, one (1) high and one (1) low. Transverse compartments shall have a minimum of two (2) lights, located one (1) each side.

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

The wiring connection for the compartment lights shall be made with a weather-resistant plug in style connector. A single water and corrosion-resistant switch with a polycarbonate actuator and sealed contacts shall control each compartment light. The switch shall allow the light to illuminate if the compartment door is open.

Ground Lights

The apparatus shall be equipped with a sufficient quantity of lights to properly illuminate the ground areas around the apparatus in accordance with current NFPA requirements. The lights shall be TecNiq model T440 4" circular LED (Light Emitting Diode) with clear lenses mounted in a resilient shock absorbent mount for improved bulb life. The wiring connections shall be made with a weather resistant plug in style connector.

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

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

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

LIGHTS - DECK AND SCENE

Hose Bed Light

A Truck-Lite round LED light model 81380 shall be installed at the front area of the hose bed to provide hose bed lighting per current NFPA 1901. The hose bed light shall be switched with the work light switch in the cab.

Scene Lights

Two (2) Whelen 900 Series Super-LED® model # 9SC0ENZR shall be provided.

The steady burn scene light shall incorporate twenty-four clear Super-LEDs, a clear gradient optic hard coated polycarbonate lens, and utilize a metal reflector for maximum output. The

Specification for: Zion Fire and Rescue

Apparatus Specifications

**Bidder
Complies**

Yes No

hard coated lens shall provide extended life/luster protection against UV and chemical stresses. The conformal coated PC board and sealed lens/reflector assembly shall provide additional protection against environmental elements. The solid-state scene light shall be vibration resistant. The high intensity scene light shall have 6500 usable lumens. The 9SC0ENZR is certified to meet KKK 1822F requirements and AMD 024 standards. An installation kit including mounting chrome flange with rubber gasket and hardware shall be provided for surface mounting. The 9SC0ENZR will contain a 12" non-terminated pigtail. The scene light is covered by a five-year factory warranty.

Voltage: +12v

Size: H=7.15", W=9.15", D=1.56"

Amp Draw: 6.0 Amps at 70°C / 3.6 Amps at 100°C

Lens Color: Clear

The first light shall be located (1) on the left rear of body up high. The second light shall be located (1) on the right rear of body up high. These lights will be switched together, with the switch located in the cab.

Brow/Visor Lights

Two (2) brow/visor lights 12v LED Spot/Flood Lights. Light Whelen Pioneer Plus model PFS2 flood/spot with brow mount (EA). Includes switch in cab. Location(s): the lights shall be in the front cab brow centered on driver side and officer side forward facing. Red housing to match cab and body paint.

Flood Lights

Two (2) lights Whelen Pioneer model PCP2SM2C surface mounted 12 volt LED spot/flood light. Includes switch in cab accessible to driver (driver and officer side facing lights switched separately). The location of these lights shall be in the upper body centered on driver side and officer side, side facing.

Flood Lights

Two (2) lights Whelen Pioneer model PFS2 light mounted on push up poles, 12 volt LED spot/flood light. Includes switch in cab accessible to driver (driver and officer side lights switched separately). The location of these lights shall be mounted on the back of the cab, one (1) on the driver side and one (1) on the officer side.

Crosslay Light

A Truck-Lite round LED light model 81380 shall be installed at the rear area of the crosslay to provide crosslay lighting per current NFPA 1901. The crosslay light shall be switched with the work light switch in the cab.

Specification for: Zion Fire and Rescue Apparatus Specifications

**Bidder
Complies**

Yes No

LIGHTS - NON-WARNING

Engine Compartment Light

There shall be LED lighting provided in compliance with NFPA to illuminate the engine compartment area. The light wiring circuit shall activate when the cab is tilted and master power is switched on.

Pump Compartment LED Light

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

Pump Panel Lighting Package - Side Mount

Pump panel lighting shall be provided for a side mount pump module in accordance with NFPA.

The driver side pump control panel shall have two (2) LED lights mounted under a protective cover that is above the driver side pump panel. The officer side shall have one (1) LED light mounted under a protective cover that is above the officer side pump panel.

The lights shall be activated by the work light switch in the cab when the park brake is set.

CONTROLS / SWITCHES

Foot Switch

A heavy duty metal floor mounted foot switch shall be installed to operate the air horns. It shall be located driver's side, officer's side.

CAMERAS / INTERCOM

Back-Up Camera

There shall be a Federal Signal (Sony) camera model number CAMCCD-REARNTSC provided and mounted on the rear of the apparatus. The camera shall feature a wide angle lens, IR LED assisted illumination for enhanced low-light performance, non-corrosive mounting bracket, and stainless steel hardware. The camera shall be wired through multiplex display, interlocked with the chassis transmission. When the apparatus is placed in reverse the camera shall automatically be activated and when the transmission is placed in any other gear the screen shall return to the previously displayed screen.

Specification for: Zion Fire and Rescue Apparatus Specifications

**Bidder
Complies**

Yes No

MISC ELECTRICAL

Back-Up Alarm

An electronic back-up alarm shall be supplied. The 97 dB alarm shall be wired into the chassis back-up lights to signal when the vehicle is in reverse gear.

Receptacle

A 20 amp, 110 volt 3-prong straight blade NEMA 5-20 duplex household receptacle with stainless steel cover plate shall be installed in a non-weather exposed area as specified by the department. The receptacle shall be wired to the inlet receptacle where it will have overcurrent protection from an external source.

Location: EMS compartment.

Receptacle

A 20 amp, 110 volt 3-prong straight blade NEMA 5-20 duplex household receptacle with stainless steel cover plate shall be installed in a non-weather exposed area as specified by the department. The receptacle shall be wired to the inlet receptacle where it will have overcurrent protection from an external source.

Location: located in the cab, toward the rear of the engine tunnel.

Electric Cord Reel

Hannay electric rewind cord reel(s) (ECR 1616-17-18) shall be installed and in the B1 compartment (location to be specified by customer prior to install). Customer supplied.

The reel(s) shall include 200' of yellow 10 gauge 3 conductor type SOWA cord. The cord shall be rated at 20 amps @ 110 volts. The end of the cord shall be terminated for the installation of a department required connector. Customer Supplied.

Electric Junction Box

A four outlet electrical junction box shall be provided and shall have an integral pilot light to indicate electrical current.

The unit shall be equipped with two (2) 120 volt 20 amp NEMA L5-20R twist-lock receptacles and two (2) 120 volt 15 amp NEMA 5-15R straight blade receptacles, each with a hinged weatherproof cover. Customer supplied.

Located on cord for the reel.

Specification for: Zion Fire and Rescue Apparatus Specifications

**Bidder
Complies**

Yes No

Rollers for the Cord Reel

Rollers; stainless steel cord reel rollers shall be installed and the location to be specified by customer prior to install.

The rollers shall facilitate smooth removal of the electric cord.

Cord Reel Rewind Switch

A heavy duty rubber covered electric reel rewind button shall be installed (location to be specified at pre-build meeting).

Circuit Breaker Panel

An eight (8) place breaker box with up to six (6) appropriately sized ground-fault interrupter circuit breakers shall be supplied. The breaker box will include a master breaker sized according to the generator output which will occupy two (2) places. The breaker box will be located in the specified compartment, not to exceed 12' run of wire.

Dimensions: 12.50" high x 8.88" wide x 3.80" deep.

Location: (location to be specified at pre-build meeting).

MISC LOOSE EQUIPMENT

DOT Required Drive Away Kit

Three (3) triangular warning reflectors with carrying case shall be supplied to satisfy the DOT requirement.

Storz Swivel 3" FNST x 4" 30 Degree Elbow [Qty. 1]

An aluminum 3" female NST x 4" Storz swivel elbow adapter with a tethered cap shall be supplied.

Chrome Elbow Adapter [Qty. 1]

A 2-1/2" FNST x 2-1/2" MNST 45-degree chrome plated discharge elbow with cap shall be supplied.

TFT High Flow, Low Profile Ball Intake Valve [Qty. 2]

Task Force Tips model #AXD1SP-NX-T manually operated lightweight aluminum high flow ball intake valve shall be provided. The unit shall be equipped with an adjustable pressure relief valve with visual pressure settings. An eight-position adjustable inlet elbow shall be located on the bottom of the valve. The valve shall be controlled with an NFPA compliant slow-close crank

Specification for: Zion Fire and Rescue Apparatus Specifications

**Bidder
Complies**

Yes No

gear operator facing the top of the valve. A 3/4" bleeder valve shall be provided to exhaust excess air or water from the valve and hoseline. A position indicator shall be provided to allow for quick visualization of the status of the valve in the open, closed or partial positions. For maximum corrosion protection, the aluminum casting shall be hard coat anodized, with a powder coat internal and external finish. All components facing the wet side of the valve shall be constructed from hard coat anodized aluminum alloy with corrosion resistant coating.

The connections shall be: 4" Storz rigid with 30 degree swiveling detent elbow and a 6" female NH swivel long handle connection and include polymer bearing strips for prevention of galvanic corrosion. The Storz coupling shall be easily configurable to swivel from rigid. The unit shall be covered by a ten-year warranty.

EXTERIOR PAINT

Un-Painted Pump/Pre-Connect Module(s)

All applicable pump application modules shall have a sanded finish (not painted). Includes upper and lower pump modules, crosswalk module and/or speedlay/pre-connect module (as applicable).

Paint Custom Cab

The apparatus cab shall be painted Sikkens FLNA3025 Red. The paint process shall meet or exceed current state regulations concerning paint operations. Pollution control shall include measures to protect the atmosphere, water, and soil. Contractor shall, upon demand, provide evidence that the manufacturing facility is in compliance with State EPA rules and regulations.

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

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

- Corrosion Prevention - all aluminum surfaces shall be pre-treated with the Alodine 5700 conversion coating to provide superior corrosion resistance and excellent adhesion of the base coat.
- Sikkens Sealer/Primer LV - acrylic urethane sealer/primer shall be applied to guarantee excellent gloss hold-out, chip resistance and a uniform base color.
- Sikkens High Solid LVBT650 (Base coat) - a lead-free, chromate-free high solid acrylic urethane base coat shall be applied, providing excellent coverage and durability. A minimum of two (2) coats shall be applied.
- Sikkens High Solid LVBT650 (Clear coat) - high solid LV clear coat shall be applied as the final step in order to ensure full gloss and color retention and durability. A minimum of two (2) coats shall be applied.

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

Specification for: Zion Fire and Rescue Apparatus Specifications	Bidder Complies	
	Yes	No
<p>penetrated. All hardware used in mounting steps, hand rails, doors, lights, or other specified components shall be individually treated with the corrosion inhibiting pre-treatment.</p> <p>After the paint process is complete, the gloss rating of the unit shall be tested with a 20-degree gloss meter. Coating thickness shall be measured with a digital MIL gauge and the orange peel with a digital wave scan device.</p> <p>Paint Wheels</p> <p>The steel chassis wheels shall be painted FLNA3025 Red. The paint shall be of the highest quality finish for minimal maintenance, long life, and attractive appearance. The finish shall consist of a corrosion-resistant primer, urethane high build primer, and high performance durable color coat.</p> <p>The paint process shall meet or exceed current State regulations concerning paint operations. Pollution control shall include measures to protect the atmosphere, water and soil. Manufacturer shall, upon demand, provide evidence that the manufacturing facility is in compliance with State EPA rules and regulations.</p> <p>Paint process shall feature Akzo-Nobel's high solid LV products and be performed in the following steps:</p> <ul style="list-style-type: none"> • Corrosion Prevention - all raw material shall be pre-treated with the Weather Jacket Corrosion Prevention system to provide superior corrosion resistance and excellent adhesion of the top coat. • Akzo-Nobel Sealer/Primer LV - acrylic urethane sealer/primer shall be applied to guarantee excellent gloss hold-out, chip resistance and a uniform base color. • Akzo-Nobel High Solid LV (Top coat) - a lead-free, chromate-free high solid acrylic urethane top coat shall be applied, providing excellent coverage and durability. A minimum of two (2) coats shall be applied. • Akzo-Nobel High Solid LV (Clear coat) - high solid LV clear coat shall be applied as the final step in order to ensure full gloss and color retention and durability. A minimum of two (2) coats shall be applied. <p>Exterior Body Surfaces</p> <p>FRP (fiber reinforced) panels shall be provided to overlay the stainless steel outer side of body panels that are not covered with aluminum treadplate. The FRP panels shall be painted as detailed under "Painting Information" and then installed on the body exterior.</p> <p>Polished Surfaces</p> <p>The vertical stainless steel Unistrut channels located on the exterior of the hose body side panels shall have a hand polished appearance.</p> <p>The reinforcing edges of the hose body side panels and trailing edges of the beavertails (if equipped) shall have a machine sanded DA finish.</p> <p>Polished stainless steel vertical corner trim scuff guards shall be installed on the outer front and rear body corners.</p>		

Specification for: Zion Fire and Rescue Apparatus Specifications

**Bidder
Complies**

Yes No

Painting Information

The final finishing of the vehicle shall be performed to the highest standards of the fire apparatus industry.

All removable components and accessories shall be fitted to the body and then removed prior to final finishing, ensuring paint has been applied under all components and accessories.

Care shall be taken during paint preparation to properly fill all surface imperfections. Welded seam areas shall be ground flush and metal finished. Bare metal surfaces shall be etched chemically to ensure proper adhesion. The primer shall be sanded to assure a smooth surface for painting.

The interior of all compartments shall have a machine sanded DA finish that shall not be painted. Compartment seams shall be sealed with a silver silicone caulk.

The interior of the hose bed shall be provided with a machine sanded DA finish that shall not be painted.

The body exterior shall be finish painted using Sikkens paint, color: FLNA3025 Red. Furnish one pint of touch-up paint, including hardener to match each of the exterior colors.

INTERIOR PAINT

Cab Interior Paint

The interior of the cab shall be painted Zolatone gray #20-64. Prior to painting, all exposed interior metal surfaces shall be pretreated using a corrosion prevention system.

STRIPING

Trim Stripe

A 1/2" Sign Gold stripe shall be applied above and below the existing boarder of the main stripe. The stripe shall be sign Gold.

Cab and Body Scotchlite Striping

A straight Scotchlite reflective stripe, 6" in width, shall be applied horizontally around the cab and body to comply with NFPA 1901.

Location: bottom of stripe flush with top of bumper and straight back.

Color: black.

Designated Standing / Walking Area Indication

A 1" wide yellow line shall be applied to indicate the outside perimeter of designated standing and walking areas above 48" from the ground in compliance with 2016 NFPA 1901. Steps, ladders and areas with a railing or structure at least 12" high are excluded from requiring the line.

Specification for: Zion Fire and Rescue Apparatus Specifications

**Bidder
Complies**

Yes No

Rear Body Scotchlite Striping

A printed sheet pattern Scotchlite chevron striping shall be provided on the rear of the apparatus in compliance with NFPA. The printed pattern shall consist of 6" yellow/red alternating stripes in an "A" pattern.

The striping shall be located on the rear compartment facing, rear panels and/or doors outboard of and above the rear compartment opening.

Bumper Scotchlite Striping

A printed sheet pattern Scotchlite chevron striping shall be provided on the bumper of the apparatus. The printed pattern shall consist of 6" yellow/red alternating stripes in an "A" pattern.

LETTERING

Sign Gold Letter [Qty. 73]

Qty. 73 Sign Gold letters up to 6" tall shall be applied.

The exact size and location of the letters shall be as specified by the customer.

Sign Gold Letter [Qty. 8]

Qty. 8 Sign Gold letters up to 12" tall shall be applied.

The exact size, color and location of the letters shall be as specified by the customer.

Lettering Shade and/or Outline [Qty. 81]

Qty. 81 Existing letters shall be shaded and/or outlined as specified by the customer to provide a contrast.

GRAPHICS

Graphics [Qty. 4]

A four (4) SignGold Customer logo's will be supplied in a digital format to assist with design to the graphic's installer. Logo's to be installed on all cab doors.

WARRANTY / STANDARD & EXTENDED

Standard 1 Year Warranty

The apparatus manufacturer shall provide a full 1-year standard warranty. All components manufactured by the apparatus manufacturer shall be covered against defects in materials or workmanship for a 1-year period. All components covered by separate suppliers such as engines, transmissions, tires, and batteries shall maintain the warranty as provided by the component supplier. A copy of the warranty document shall be provided with the proposal.

Specification for: Zion Fire and Rescue Apparatus Specifications

**Bidder
Complies**

Yes No

Lifetime Frame Warranty

The apparatus manufacturer shall provide a full lifetime frame warranty. This warranty shall cover all apparatus manufacturer designed frame, frame members, and cross-members against defects in materials or workmanship for the lifetime of the covered apparatus. A copy of the warranty document shall be provided with the proposal. Frame warranties that do not cover cross-members for the life of the vehicle shall not be acceptable.

10 Year 100,000 Mile Structural Warranty

The apparatus manufacturer shall provide a comprehensive 10 year/100,000-mile structural warranty. This warranty shall cover all structural components of the cab and/or body manufactured by the apparatus manufacturer against defects in materials or workmanship for 10 years or 100,000 miles, whichever occurs first. Excluded from this warranty are all hardware, mechanical items, electrical items, or paint finishes. A copy of the warranty document shall be provided with the proposal.

10 Year Stainless Steel Plumbing Warranty

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

10 Year Paint and Corrosion Warranty

The apparatus manufacturer shall provide a 10-year limited paint and corrosion perforation warranty. This warranty shall cover paint peeling, cracking, blistering, and corrosion provided the vehicle is used in a normal and reasonable manner.

The paint shall be prorated for 10 years as follows:

Topcoat & Appearance: Gloss, Color Retention, Cracking		Coating System, Adhesion & Corrosion: Includes Dissimilar metal corrosion, Flaking, Blistering, Bubbling	
0 to 72 months	100%	0 to 36 months	100%
73 to 120 months	50%	37 to 84 months	50%
		85 to 120 months	25%

Corrosion perforation shall be covered 100% for 10 years. Corrosion perforation is defined as complete penetration through the exterior metal of the apparatus.

The warranty period shall begin upon delivery of the apparatus to the original user-purchaser. A copy of the warranty document shall be provided with the proposal.

UV paint fade shall be covered in a separate warranty supplied by Akzo Nobel (Sikkens) and shall be for a minimum of 10 years.

Specification for: Zion Fire and Rescue Apparatus Specifications

**Bidder
Complies**

Yes No

Warranty 20 Year Structural

The apparatus manufacturer shall provide a comprehensive 20 year/100,000-mile structural warranty. This warranty shall cover all structural components of the stainless-steel body manufactured by the apparatus manufacturer against defects in materials or workmanship for 20 years or 100,000 miles, whichever occurs first. Excluded from this warranty are all hardware, mechanical items, electrical items, or paint finishes. A copy of the warranty document shall be provided with the proposal.

25 Year Frame Rail Corrosion Warranty

The chassis manufacturer shall provide a 25-year corrosion warranty on the chassis frame rails. This warranty shall cover the chassis frame rails, including frame rail liners (if equipped), for a period of 25 years after the date on which the vehicle is delivered to the original purchaser. A copy of the warranty document shall be provided with the proposal. Please refer to warranty document for complete details and exclusions.

SUPPORT, DELIVERY, INSPECTIONS AND MANUALS

Electronic Manuals

Two (2) copies of all operator, service, and parts manuals MUST be supplied at the time of delivery in electronic format (CD-ROMs) -NO EXCEPTIONS! The electronic manuals shall include the following information:

- Operating Instructions, descriptions, specifications, and ratings of the cab, chassis, body, aerial (if applicable), installed components, and auxiliary systems.
- Warnings and cautions pertaining to the operation and maintenance of the fire apparatus and firefighting systems.
- Charts, tables, checklists, and illustrations relating to lubrication, cleaning, troubleshooting, diagnostics, and inspections.
- Instructions regarding the frequency and procedure for recommended maintenance.
- Maintenance instructions for the repair and replacement of installed components.
- Parts listing with descriptions and illustrations for identification.
- Warranty descriptions and coverage.

The CD-ROM shall incorporate a navigation page with electronic links to the operator's manual, service manual, parts manual, and warranty information, as well as instructions on how to use the manual. Each copy shall include a table of contents with links to the specified documents or illustrations.

The CD must be formatted in such a manner as to allow not only the printing of the entire manual, but to also the cutting, pasting, or copying of individual documents to other electronic media, such as electronic mail, memos, and the like.

A find feature shall be included to allow for searches by text or by part number.

Specification for: Zion Fire and Rescue
Apparatus Specifications

**Bidder
Complies**

Yes No

These electronic manuals shall be accessible from any computer operating system capable of supporting portable document format (PDF). Permanent copies of all pertinent data shall be kept file at both the local dealership and at the manufacturer's location.

NOTE: Engine overhaul, engine parts, transmission overhaul, and transmission parts manuals are not included.

Fire Apparatus Safety Guide

Fire Apparatus Safety Guide published by FAMA, latest edition. This safety manual is intended to point out some of the basic safety situations that may be encountered during the normal operation and maintenance of a fire apparatus and to suggest possible ways of dealing with these situations. This manual is NOT a substitute for the OEM's fire apparatus operator and maintenance manuals or commercial chassis manufacturer's operator and maintenance manuals.

Zion Fire Rescue Department

DEALER INFORMATION
Number of years representing the manufacturer proposed:
Number of employees working for the Dealer:
Locations of available service shops authorized by the manufacturer to provide warranty service within 75 miles from ZFRD:
Number of EVT SAE certified technicians at the service shops proposed:
Is emergency mobile service available in our station? If so describe.
Is emergency roadside service available? If so describe.

Bid Quotation

Sign in ink in the space provided below. UNSIGNED bids will be considered incomplete and will be subject to rejection.

It is agreed by the undersigned Bidder that the signing and delivery of this bid represents the Bidder's acceptance of the terms and conditions of the foregoing specifications and provisions, and if awarded the bid by the City of Zion, will represent the agreement between the parties.

Name of Firm: _____

Signed (in ink): _____

Name and Title: _____

Manufacturer of Vehicle: _____

Model Year: _____

Street Address: _____

Mailing Address: _____

City, State, Zip: _____

Phone Number(s): _____

BID QUOTATION: _____

Complete Apparatus delivery will be made in _____ Calendar days

Amount charged for performance bond: _____

Discount Schedule For Pre-Payment Upon Contract Signing

Pre-Payment Amount	Discount
\$25,000.00	_____
\$50,000.00	_____
\$75,000.00	_____
\$100,000.00	_____
\$125,000.00	_____
\$150,000.00	_____
\$175,000.00	_____
\$200,000.00	_____

Discount for payment of chassis upon completion: _____